Supporting Information for *Organic Letters*

Dicobalt Octacarbonyl-Promoted Rearrangement of 4-Isoxazolines to Acylaziridines: Establishment of Dramatic Rate Acceleration with Very High Substrate Tolerance

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Experimental Section

General. IR spectra were recorded on a Horiba Fourier transform infrared spectrophotometer Model FT-210 instrument and only typical absorptions were cited. ^{1}H NMR and ^{13}C NMR spectra were recorded on a Varian VXR-200 (200 MHz for proton and 50 MHz for carbon-13), Varian Mercury-300 (300 MHz for proton and 75 MHz for carbon-13) instrument. The chemical shifts are given in δ unit relative to internal $CHCl_3$ (7.26 ppm for ^{1}H) or $CDCl_3$ (77 ppm for ^{13}C). All NMR experiments were performed using deuteriochloroform as a solvent unless otherwise indicated. ^{1}H NMR spectral data were indicated in the form: δ value of signal (peak multiplicities, integrated number of protons, and coupling constant (if any)). The peak multiplicities are abbreviated as follows: s, singlet; d, doublet; t, triplet; q, quartet; m, multiplet; br, broad. Analytical thin layer chromatography was performed on Merck pre-coated silica gel 60 F-254 (0.25 mm thickness). Elemental analyses were made with a Perkin-Elmer 2400 CHN Elemental Analyzer. All reactions, unless otherwise noted, were conducted under nitrogen or argon atmosphere. Liquid reagents were transferred via a dry hypodermic syringe from sure seal bottles to a reaction flask through a rubber septum wired onto the reaction flask. The septum can also serve to permit evacuation to eliminate air and introduce the inert gas by means of a steady stream of inert gas flowing system. Organic extracts were concentrated by evaporation with a rotary evaporator evacuated at around 60 mmHg. Column chromatography, unless otherwise specified, was performed on a Merck silica gel 60 7734 using an appropriate ratio of ethyl acetate (AcOEt)-hexane mixed solvent and abbreviated as CC.

Materials. Unless otherwise noted, materials were obtained from commercial suppliers and

reagent grade materials were used without further purification. Dimethylformamide (DMF), acetnitrile (MeCN), toluene, dichloromethane (CH_2Cl_2), and triethylamine (Et_3N) were freshly distilled from CaH_2 prior to use. Tetrahydrofuran (THF) purchased from Kanto Chemical Co., Inc is dehydrated and stabilizer-free grade and was used as received.

General Procedure for the Preparation of 4-isoxazoline Derivatives (**1a—1d**). To a solution of a nitrone (2.9 mmol) in toluene (5 mL) was added phenylacetylene (5.8 mmol, 2.0 eq). The reaction mixture was heated at 75 ℃ for 8 h and was concentrated to afford a crude residue, which was purified by CC to give a 4-isoxazoline: for the synthesis of every substrate only one or two runs were conducted, and the yields were not optimized yet.

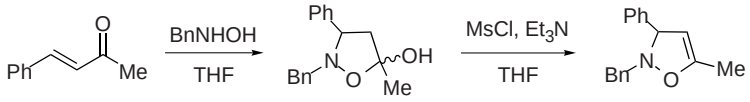
2-Benzyl-3-isopropyl-5-phenyl-4-isoxazoline (**1a**). 63% yield; IR (film) 2958, 1495, 1276, 1024 cm^{-1}; ^1H NMR δ 0.91 (d, 6H, *J* = 6.9 Hz, $(CH_3)_2C$), 1.72 (dq, 1H, *J* = 6.6 Hz, 6.9 Hz, $(CH_3)_2CH$), 3.71 (dd, 1H, *J* = 2.8 Hz, 6.6 Hz, NC*H*), 3.89 and 4.30 (ABq, 2H, *J* = 12.6 Hz, $PhCH_2N$), 5.34 (d, 1H, *J* = 2.8 Hz, OCC*H*), 7.28–7.59 (m, 10H, Ar-H); ^{13}C NMR δ 18.3, 18.7, 33.7, 63.8, 76.5, 93.7, 125.5, 127.4, 128.2, 128.3, 128.7, 129.8, 132.0, 136.7, 152.4.

2-Benzyl-3,5-diphenyl-4-isoxazoline (**1b**). 33% yield; IR (KBr) 1495, 1020, 725 cm^{-1}; ^1H NMR δ 4.14 and 4.47 (ABq, 2H, *J* = 12.6 Hz, $PhCH_2N$), 5.08 (d, 1H, *J* = 3.0 Hz, BnNC*H*), 5.46 (d, 1H, *J* = 3.0 Hz, OC=C*H*), 7.24–7.65 (m, 15H, Ar-H); ^{13}C NMR δ 63.4, 73.5, 95.7, 125.7, 127.1, 127.5, 128.3, 128.4, 128.5, 128.7, 129.0, 129.6, 130.0, 136.3, 142.0, 152.8.

2-Benzyl-3-(4-methoxy)phenyl-5-phenyl-4-isoxazoline (**1c**). 13% yield; IR (film) 1609, 1511, 1448, 1303 cm^{-1}; ^1H NMR δ 3.79 (s, 3H, *Me*O), 4.13 and 4.45 (ABq, 2H, *J* = 12.6 Hz, $PhCH_2N$), 5.05 (d, 1H, *J* = 2.5 Hz, BnNC*H*), 5.43 (d, 1H, *J*= 2.5 Hz, OC=C*H*), 6.81–7.64 (m, 14H, Ar-H); ^{13}C NMR δ 55.2, 63.2, 73.1, 95.8, 113.8, 125.7, 127.5, 128.1, 128.3, 128.7, 129.0, 129.6, 134.1, 136.4, 152.7, 159.0.

2-Benzyl-3-hepthyl-5-phenyl-4-isoxazoline (**1d**). 50% yield; ^1H NMR δ 0.88 (t, 3H, *J* = 6.6 Hz, Me), 1.05–2.80 (m, 12H, $CH_3(CH_2)_6CH$), 3.88 and 4.29 (ABq, 2H, *J* = 12.4 Hz, $PhCH_2N$), 3.92 (m, 1H, BnNC*H*), 5.31 (d, 1H, *J* = 2.8 Hz, OC=C*H*), 7.28–7.57 (m, 10H, Ar-H); ^{13}C NMR δ 14.1, 22.6, 25.7, 29.3, 29.4, 31.8, 36.3, 63.2, 70.2, 95.8, 125.5, 127.4, 128.3, 128.7, 129.0, 129.7, 136.6, 152.1.

2-Benzyl-3,3-dimethyl-5-phenyl-4-isoxazoline (**1e**). To a solution of acetone (4.0 mL) in toluene (4.0 mL) was added *N*-benzylhydroxylamine (220 mg, 1.79 mmol). The reaction mixture was stirred at 70 ℃ for 1 h. To the reaction was added phenylacetylene (0.59 mL, 5.37 mmol, 3.0 eq), and the mixture was heated at 75 ℃ for 21 h and concentrated to afford a crude residue, which was purified by CC to give isoxazoline **1e** (61 mg, 13 %) as a colorless oil. ^{1}H NMR δ 1.41 (s, 6H, *MeMe*C), 4.02 (s, 2H, PhCH_2N), 5.32 (s, 1H, OC=C*H*), 7.25–7.50 (m, 10H, Ar-H); ^{13}C NMR δ 25.5, 56.0, 68.8, 76.6, 103.6, 125.3, 127.0, 128.2, 128.3, 128.6, 129.2, 138.2, 151.6.



6 **1f**

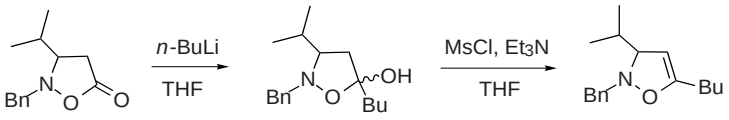
2-Benzyl-5-methyl-3-phenyl-4-isoxazoline (**1f**). To a solution of benzalacetone (315 mg, 2.15 mmol) in THF (7 mL) was added *N*-benzylhydroxylamine (217 mg, 1.76 mmol). The reaction mixture was stirred at room temperature for 6 h and concentrated to afford a crude residue, which was purified by CC to give isoxazolidine **6** (382 mg, 1.42 mmol, 81 %) as a colorless oil. To a solution of **6** (205 mg, 0.76 mmol) in THF (5 mL) were added Et_3N (0.33 mL, 2.33 mmol) and methanesulfonyl chloride (0.09 mL, 1.16 mmol) at 0 ℃. The mixture was stirred at 0 ℃ for 20 min followed by the addition of water. The mixture was extracted with AcOEt, and the combined organic solutions were dried with Na_2SO_4 and concentrated to give an oil, which, on CC, gave isoxazoline **1f** (133 mg, 84 % conv.) as a colorless oil. ^{1}H NMR δ 1.90 (s, 3H, OC*Me*), 4.07 and 4.34 (ABq, 2H, *J* = 13.0 Hz, PhCH_2N), 4.67 (br, 1H, PhC*H*), 4.87 (br, 1H, OC=C*H*), 7.2–7.4 (m, 10H, Ar-H); ^{13}C NMR δ 11.6, 63.4, 73.3, 95.8, 126.9, 127.3, 127.4, 128.3, 128.3, 129.4, 136.6, 142.7, 151.4.

General Procedure for the Preparation of 4-isoxazoline Derivatives (**1g**, **h**). A solution of a nitrone (1.13 mmol) in bis(trimethylsilyl)acetylene (5.73 mmol, 5.0 eq) was heated at 100 ℃ for 4 h. The mixture was concentrated *in vacuo* to afford a crude residue, which was purified by CC to give an oil: the yields were not optimized yet.

2-Benzyl-3-phenyl-4,5-bis(trimethylsilyl)-4-isoxazoline (**1g**). 70% yield; IR (film) 2957, 1250, 842 cm^{-1}; ^{1}H NMR δ 0.00 (s, 9H, SiMe_3), 0.33 (s, 9H, SiMe_3), 3.82 and 4.16 (ABq, 2H, *J* = 12.6 Hz, PhCH_2N), 4.80 (s, 1H, PhC*H*), 6.95–7.40 (m, 10H, Ar-H); ^{13}C NMR

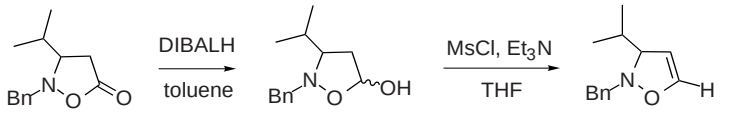
δ -0.6, 0.8, 62.6, 77.5, 116.3, 127.3, 127.6, 128.2, 128.3, 129.7, 136.6, 142.0, 161.7.

2-Benzyl-3-isopropyl-4,5-bis(trimethylsilyl)-4-isoxazoline (**1h**). 87% yield; IR (film) 2958, 1565, 1250, 1073, 832 cm^{-1}; ^1H NMR δ 0.16 (s, 9H, Si*Me*$_3$), 0.24 (s, 9H, Si*Me*$_3$), 0.70 (d, 3H, *J* = 6.9 Hz, (C*H*$_3$)$_2$C), 0.71 (d, 3H, *J* = 6.6 Hz, (C*H*$_3$)$_2$C), 1.35–1.50 (m, 1H, (CH$_3$)$_2$C*H*), 3.57 and 3.95 (ABq, 2H, *J* = 12.1 Hz, PhC*H*$_2$N), 3.70 (d, 1H, *J* = 2.5 Hz, BnNC*H*), 7.22–7.37 (m, 5H, Ar-H); ^{13}C NMR δ -0.7, 1.0, 14.9, 20.0, 31.8, 62.7, 78.4, 114.6, 127.2, 128.1, 130.1, 136.7, 161.5.



7 **8** **1i**

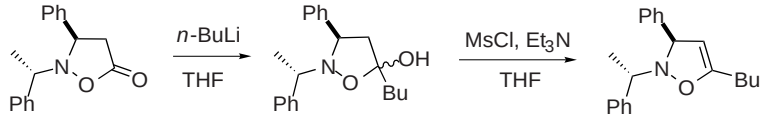
2-Benzyl-5-butyl-3-isopropyl-4-isoxazoline (**1i**). To a solution of isoxazolidinone **7** (402 mg, 1.84 mmol) in THF (10 mL) was added *n*-BuLi (1.6 M solution in hexane, 1.25 mL, 1.1 equiv) at –78 ℃, and the mixture was stirred at –78 ℃ to room temperature for 7 h. The reaction mixture was quenched by the addition of water and extracted with AcOEt. The combined organic solutions were dried with Na_2SO_4 and concentrated to give an oil, which, on CC, gave isoxazolidine **8** (191 mg, 38 %) and unchanged **7** (73 mg, 18 %). To a solution of **8** (176 mg, 0.63 mmol) in THF (5 mL) were added Et_3N (0.26 mL, 3.0 equiv) and methanesulfonyl chloride (0.07 mL, 1.5 equiv) at 0 ℃. The reaction was stirred at 0 ℃ to room temperature for 1 h followed by the addition of water. The mixture was extracted with AcOEt, and the combined organic solutions were dried with Na_2SO_4 and concentrated to give an oil, which, on CC, gave isoxazoline **1i** (60 mg, 37 %) as a colorless oil and unchanged **8** (46 mg, 26 %). ^1H NMR δ 0.81 (d, 6H, *J* = 6.9 Hz, (C*H*$_3$)$_2$C), 0.93 (t, 3H, *J* = 7.4 Hz, CH$_2$C*H*$_3$), 1.20–1.58 (m, 5H, C*H*$_2$CH$_3$, C*H*$_2$CH$_2$CH$_3$, (CH$_3$)$_2$C*H*), 2.06–2.11 (m, 2H, OCC*H*$_2$), 3.40 (m, 1H, NC*H*), 3.77 and 4.14 (ABq, 2H, *J* = 12.6 Hz, PhC*H*$_2$N), 4.44 (m, 1H, OC*H*=C) 7.18–7.40 (m, 5H, Ar-H); ^{13}C NMR δ 13.8, 18.2, 18.5, 22.2, 25.7, 29.0, 33.8, 63.9, 76.0, 92.3, 127.2, 128.1, 129.6, 137.0, 155.0.



7 **9** **1j**

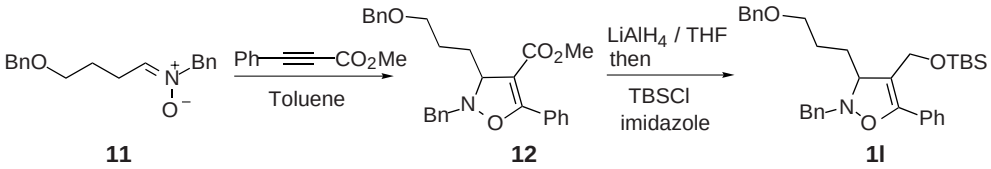
2-Benzyl-3-isopropyl-4-isoxazoline (**1j**). To a solution of isoxazolidinone **7** (527 mg,

2.40 mmol) in THF (10 mL) was added DIBAL-H (1.0 M solution in toluene, 2.6 mL, 1.1 equiv) at –78 ℃, and the mixture was stirred at –78 ℃ for 30 min. The reaction was quenched by the addition of water and filtered through a celite pad, the filter cake being thoroughly rinsed with AcOEt. The combined organic solutions were dried with Na_2SO_4 and concentrated to give an oil, which, on CC, gave isoxazolidine **9** (442 mg, 83 %). To a solution of **9** (418 mg, 1.78 mmol) in THF (10 mL) was added Et_3N (0.75 mL, 3.0 equiv) and methanesulfonyl chloride (0.20 mL, 1.5 equiv) at 0 ℃. The reaction was stirred at 0 ℃ to room temperature for 1 h followed by the addition of water. The mixture was extracted with AcOEt, and the combined organic solutions were dried with Na_2SO_4 and concentrated to give an oil, which, on CC, gave isoxazoline **1j** (172 mg, 48 %) and unchanged **9** (155 mg, 37 %). ^{1}H NMR δ 0.83 (d, 3H, *J* = 1.7 Hz, $(CH_3)_2C$), 0.85 (d, 3H, *J* = 1.7 Hz, $(CH_3)_2C$), 1.50–1.63 (m, 1H, $(CH_3)_2CH$), 3.55–3.58 (m, 1H, $(CH_3)_2CCH$), 3.79 and 4.15 (ABq, 2H, *J* = 12.9 Hz, $PhCH_2N$), 4.88 (m, 1H, OC=CH), 6.45 (m, 1H, OCH=C) 7.24–7.45 (m, 5H, Ar-H); ^{13}C NMR δ 18.1, 18.4, 33.5, 63.8, 74.9, 97.5, 127.3, 128.2, 129.3, 136.8, 141.5.



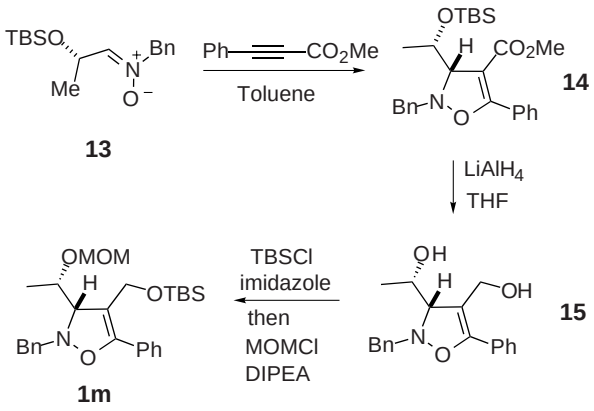
(3*R*)-5-Butyl-3-phenyl-2-[(1*S*)-1-phenyl]ethyl-4-isoxazoline (**1k**). To a solution of isoxazolidinone **4** (110 mg, 0.41 mmol) in THF (3.0 mL) was added *n*-BuLi (1.56 M solution in hexane, 0.4 mL, 1.5 equiv) at –40 ℃ and the mixture was stirred at –45 ℃ to room temperature for 1.5 h. The reaction was quenched by the addition of water and extracted with AcOEt. The combined organic solutions were dried with Na_2SO_4 and concentrated to give an oil, which, on CC, gave the mixture of **4** and **10** (95 mg). To a solution of **4** and **10** (95 mg) in THF (5 mL) was added Et_3N (0.33 mL, 2.33 mmol) and methanesulfonyl chloride (0.09 mL, 1.16 mmol) at 0 ℃. The reaction was stirred at 0 ℃ for 20 min followed by the addition of water and extracted with AcOEt. The combined organic solutions were dried with Na_2SO_4 and concentrated to give an oil, which, on careful CC, gave isoxazoline **1k** (28 mg, 22 % for 2 steps) as a colorless oil and unchanged **4** (17 mg, 16 %). $[\alpha]_D^{28}$ +253 (c 0.730, $CHCl_3$); ^{1}H NMR δ 0.96 (t, 3H, *J* = 7.4 Hz, CH_2CH_3), 1.56 (d, 3H, *J* = 6.3 Hz, Ph*Me*CH), 1.37–1.48 (m, 4H, $(CH_2)_2CH_3$), 2.26–2.31 (m, 2H, $CH_2(CH_2)_2CH_3$), 4.07–4.13 (m, 2H, PhC*H*Me), 4.59–4.60 (m, 1H, OC=C*H*), 4.74 (br,

1H, NC*H*), 6.94–7.35 (m, 10H, Ar-H); ^{13}C NMR δ 13.8, 21.8, 22.4, 25.7, 29.2, 67.2, 71.7, 95.0, 126.9, 127.0, 127.5, 128.2, 128.3, 128.4, 142.4, 143.1, 155.4.



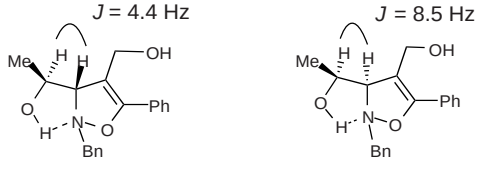
11 **12** **1l**

2-Benzyl-3-(3-benzyloxy)propyl-4-(*tert*-butyldimethylsilyloxy)methyl-5-phenyl-4-isoxazoline (**1l**). A solution of nitrone **11** (501 mg, 1.77 mmol) and methyl 3-phenylpropiolate (1.28 g, 5.0 equiv) in toluene (3 mL) was heated at 75 ℃ for 2 h. The mixture was concentrated to afford a crude residue, which was purified by CC to give isoxazoline **12** (699 mg, 89%). To a solution of **12** (274 mg, 0.618 mol) in THF (14 mL) was added $LiAlH_4$ (29 mg, 1.0 equiv) at room temperature and the mixture was stirred at room temperature for 1 h. The reaction was quenched by the addition of water and filtered through a celite pad, the filter cake being thoroughly rinsed with AcOEt. The combined organic solutions were dried with Na_2SO_4 and concentrated to give an oil, which, on CC, gave an alcohol (250 mg, 97 %). To a solution of the alcohol (95 mg, 0.23 mol) in THF (2 mL) was added imidazole (71 mg, 4.0 equiv) and *tert*-butyldimethylsilyl chloride (70 mg, 2.0 equiv) at 0 ℃. The mixture was stirred at 0 ℃ to room temperature for 4.5 h followed by the addition of water. The mixture was extracted with AcOEt, and the combined organic solutions were dried with Na_2SO_4 and concentrated to give an oil, which, on CC, gave isoxazoline **1l** (118 mg, 97 %). ^{1}H NMR δ 0.07 (s, 6H, *tert*-BuSi*Me*$_2$), 0.93 (s, 9H, (C*H*$_3$)$_3$CSi), 1.5–1.8 (m, 4H, BnOCH$_2$C*H*$_2$C*H*$_2$), 3.3–3.5 (m, 2H, BnOC*H*$_2$), 3.88 and 4.30 (ABq, 2H, *J* = 12.4 Hz, PhC*H*$_2$N), 4.02 (m, 1H, NC*H*), 4.38 and 4.46 (ABq, 2H, *J* = 12.1 Hz, CH$_2$OTBS), 4.40 (s, 2H, PhC*H*$_2$O), 7.23–7.51 (m, 15H, Ar-H); ^{13}C NMR δ –5.3, –5.4, 18.2, 25.7, 25.8, 30.4, 56.7, 62.6, 71.2, 70.9, 72.7, 109.6, 127.3, 127.4, 127.5, 127.8, 128.21, 128.25, 128.9, 129.2, 129.7, 136.5, 138.6, 148.0.



(3*S*)-2-Benzyl-4-(*tert*-butyldimethylsilyloxy)methyl-3-[(1*S*)-1-(methoxymethoxy)ethyl]-5-phenyl-4-isoxazoline (**1m**). A solution of nitrone **13** (560 mg, 2.05 mmol) and methyl 3-phenylpropiolate (655 mg, 2.0 equiv) in toluene (3 mL) was heated at 75 ℃ for 2 h. The mixture was concentrated to afford a crude residue, which was purified by CC to give isoxazoline **14** (661 mg, 71 %) as a mixture of diastereomers (major : minor = 9 : 1). To a solution of **14** (160 mg, 0.35 mmol) in THF (3 mL) was added $LiAlH_4$ (40 mg, 3.0 equiv) at room temperature, and the mixture was stirred at room temperature for 1 h. The reaction was quenched by the addition of water and filtered through a celite pad, the filter cake being thoroughly rinsed with AcOEt. The combined organic solutions were dried with Na_2SO_4 and concentrated to give an oil, which, on CC, gave diol **15** (89 mg, 81 %) as a mixture of separable diastereomers. Data for **15** (major isomer): ^{1}H NMR δ 1.22 (d, 3H, *Me*CH), 3.20–3.55 (br, 2H, CH_2O*H*, MeCHO*H*), 3.84–3.78 (m, 1H, MeC*H*), 3.92 and 4.29 (ABq, 2H, *J* = 12.9 Hz, PhCH_2N), 4.01 (d, 1H, *J* = 4.4 Hz, NC*H*), 4.22 and 4.41 (ABq, 2H, *J* = 12.4 Hz, CH_2OH), 4.63 and 4.60 (ABq, 2H, *J* = 6.9 Hz, MeOCH_2), 7.25–7.61 (m, 10H, Ar-H); ^{13}C NMR δ 17.8, 57.0, 63.3, 69.4, 77.1, 104.3, 127.7, 128.0, 128.2, 128.4, 128.5, 129.4, 129.6, 129.7, 135.9, 151.8.

The absolute configurations of the each diastereomers of diol **15** were determined by careful analysis of ^{1}H NMR including J-value.



15 (major isomer) **15** (minor isomer)

To a solution of **15** (72 mg, 0.23 mmol) in THF (3 mL) were added imidazole (125 mg, 8.0 equiv) and *tert*-butyldimethylsilyl chloride (139 mg, 4.0 equiv) at 0 ℃ and the mixture was stirred at 0 ℃ to room temperature for 2.5 h. The reaction was quenched by the addition of water and

extracted with AcOEt. The combined organic solutions were dried with Na_2SO_4 and concentrated to give an oil, which, on CC, gave an alcohol (45 mg, 46 %). To a solution of the alcohol (165 mg, 0.39 mmol) in THF (5.5 mL) were added *N*,*N*-diisopropylethylamine (0.8 mL, 12.0 equiv) and chloromethyl methyl ether (0.18 mL, 6.0 equiv) at 0 ℃. The mixture was stirred at 40 ℃ for 24 h. The reaction was quenched by the addition of water and extracted with AcOEt. The combined organic solutions were dried with Na_2SO_4 and concentrated to give an oil, which, on CC, gave isoxazoline **1m** (133 mg, 73 %) as a colorless oil. $[\alpha]_D^{28}$ –107 (c 1.68, $CHCl_3$); ^{1}H NMR δ 0.05 (s, 6H, *tert*-BuSi*Me*$_2$), 0.91 (s, 9H, (C*H*$_3$)$_3$CSi), 3.26 (s, 3H, *Me*O), 3.76 (m, 1H, MeC*H*), 3.87 and 4.33 (ABq, 2H, *J* = 12.4 Hz, PhC*H*$_2$N), 4.06 (m, 1H, NC*H*), 4.42 and 4.46 (ABq, 2H, *J* = 12.1 Hz, C*H*$_2$OTBS), 4.63 and 4.60 (ABq, 2H, *J* = 6.9 Hz, MeOC*H*$_2$), 7.2–7.6 (m, 10H, Ar-H); ^{13}C NMR δ –5.4, –5.2, 16.4, 18.3, 25.9, 55.2, 57.0, 63.3, 74.2, 74.4, 95.4, 106.1, 127.6, 127.9, 128.2, 128.3, 128.3, 129.1, 129.9, 136.1, 150.2.

General Procedure for Cobalt Octacarbonyl-Promoted Rearrangement Reactions. To a solution of a 4-isoxazoline (0.410 mmol) in MeCN (8 mL) was added dicobalt octacarbonyl (0.205 mmol, 0.5 eq). The brown solution was stirred at room temperature for 5 min, and the reaction vessel was immersed into an oil bath heated at 75 ℃, stirring being continued for 0.5—1.0 h. The solution was left in contact with air for a few hours to induce decomposition of the cobalt reagent. The resulting precipitate was filtered through a celite pad and the filter cake was washed several times with AcOEt. The combined filtrates were concentrated to give an oil, which was purified by CC to give 2-acylaziridines **2** and **3**.

(2*S,3*S**)-2-Benzoyl-1-benzyl-3-(isopropyl)aziridine** (**2a**). 41% yield (35 mg); IR (KBr) 2955, 1676, 1450, 1228 cm^{-1}; ^{1}H NMR δ 0.70 (d, 3H, *J* = 6.9 Hz (C*H*$_3$)$_2$C), 0.91 (d, 3H, *J* = 6.6 Hz, (C*H*$_3$)$_2$C), 1.4–1.6 (m, 1H, (CH$_3$)$_2$C*H*), 1.92 (dd, 1H, *J* = 6.9 Hz, 9.6 Hz, (CH$_3$)$_2$CC*H*), 3.13 (d, 1H, *J* = 6.9 Hz, O=CC*H*), 3.62 and 3.74 (ABq, 2H, *J* = 13.5 Hz, PhC*H*$_2$N), 7.22–8.05 (m, 10H, Ar-H); ^{13}C NMR δ 19.9, 20.8, 26.8, 47.8, 56.4, 64.5, 127.2, 128.1, 128.27, 128.29, 128.5, 133.0, 137.3, 137.8, 195.1

(2*R,3*S**)-2-Benzoyl-1-benzyl-3-(isopropyl)aziridine** (**3a**). 10% yield (7.3 mg); IR (film) 2959, 1668, 1448, 1227 cm^{-1}; ^{1}H NMR δ 0.84 (d, 3H, *J* = 6.6 Hz, (C*H*$_3$)$_2$C), 0.91 (d, 3H, *J* = 6.9 Hz, (C*H*$_3$)$_2$C), 1.37–1.50 (m, 1H, (CH$_3$)$_2$C*H*), 2.38 (dd, 1H, *J* = 2.8 Hz, 8.0 Hz, (CH$_3$)$_2$CC*H*), 3.44 (d, 1H, *J* = 2.8 Hz, O=CC*H*), 3.80 (s, 2H, PhC*H*$_2$N), 7.18–7.99 (m, 10H,

Ar-H); ^{13}C NMR δ 19.5, 20.2, 31.8, 43.4, 54.8, 55.5, 127.0, 128.2, 128.3, 128.6, 128.9, 133.1, 138.3, 139.1, 196.0.

(2*S,3*S**)-2-Benzoyl-1-benzyl-3-(phenyl)aziridine** (**2b**). 45% yield (28 mg); IR (KBr) 1684, 1450, 1224 cm^{-1}; ^{1}H NMR δ 3.32 (d, 1H, *J* = 6.9 Hz, O=CC*H*), 3.41 (d, 1H, *J* = 6.9 Hz, PhC*H*), 3.82 and 4.04 (ABq, 2H, *J* = 14.0 Hz, PhCH_2N), 7.10–7.88 (m, 15H, Ar-H); ^{13}C NMR δ 49.7, 51.1, 63.8, 127.1, 127.4, 127.5, 127.8, 127.9, 128.1, 128.3, 128.4, 132.9, 134.9, 136.9, 137.7, 193.1.

(2*R,3*S**)-2-Benzoyl-1-benzyl-3-(phenyl)aziridine** (**3b**). 16% yield (10 mg); IR (film) 1668, 1448, 1230 cm^{-1}; ^{1}H NMR δ 3.63–3.67 (m, 2H, PhC*H*, O=CC*H*), 4.01 and 4.17 (ABq, 2H, *J* = 13.7 Hz, PhCH_2N), 7.12–8.04 (m, 15H, Ar-H).

(2*S,3*S**)-2-Benzoyl-1-benzyl-3-(4-methoxy)phenylaziridine** (**2c**). 52% yield (13.2 mg); IR (film) 1687, 1613, 1229, 1032 cm^{-1}; ^{1}H NMR δ 3.28 (d, 1H, *J* = 6.9 Hz, O=CC*H*), 3.37 (d, 1H, *J* = 6.9 Hz, MeO-PhC*H*), 3.70 (s, 3H, *Me*O), 3.79 and 4.03 (ABq, 2H, *J* = 14.0 Hz, PhCH_2N), 6.70–7.89 (m, 14H, Ar-H); ^{13}C NMR δ 49.6, 51.1, 55.1, 63.8, 113.4, 126.9, 127.1, 127.8, 128.1 (2C), 128.4, 128.6, 132.9, 137.0, 137.8, 158.8, 193.3.

(2*R,3*S**)-2-Benzoyl-1-benzyl-3-(4-methoxy)phenylaziridine** (**3c**). 23% yield (6 mg); ^{1}H NMR δ 3.59 (d, 1H, *J* = 2.8 Hz, O=CC*H*), 3.62 (d, 1H, *J* = 2.8 Hz, 4MeO-PhC*H*), 3.79 (s, 3H, *Me*O), 4.01 and 4.17 (ABq, 2H, *J* = 14.0 Hz, PhCH_2N), 6.82–8.02 (m, 14H, Ar-H).

(2*S,3*S**)-2-Benzoyl-1-benzyl-3-(hepthyl)aziridine** (**2d**). 61% yield (44 mg); **3d** in 25% yield (17.2 mg); ^{1}H NMR δ 0.88 (t, 3H, *J* = 6.6 Hz, *Me*CH) , 1.0–1.6 (m, 12H, $CH_3(CH_2)_6CH$), 2.26 (m, 1H, CH_2CH), 3.14 (d, 1H, *J* = 7.2 Hz, O=CC*H*), 3.68 and 3.84 (ABq, 2H, *J* = 14.0 Hz, PhCH_2N), 7.25–8.10 (m, 10H, Ar-H); ^{13}C NMR δ 14.0, 22.5, 27.4, 27.6, 29.0, 29.1, 31.5, 47.4, 49.1, 64.2, 127.1, 128.0, 128.1, 128.3, 128.5, 133.0, 137.2, 138.0, 195.1.

(2*S)-2-Benzoyl-1-benzyl-3,3-(dimethyl)aziridine** (**2e**). 66% yield (15 mg); ^{1}H NMR δ 1.21 (s, 3H, *Me*MeC), 1.54 (s, 3H, Me*Me*C), 2.93 (s, 1H, Me_2CH), 3.86 and 3.94 (ABq, 2H, *J* = 14.6 Hz, PhCH_2N), 7.19–7.98 (m, 10H, Ar-H); ^{13}C NMR δ 17.8, 21.7, 46.6, 54.5, 56.2, 126.7, 127.2, 128.0, 128.5, 133.0, 137.3, 139.1, 195.7.

(2*S,3*S**)-2-Acetyl-1-benzyl-3-(phenyl)aziridine** (**2f**). 47% yield (26 mg); ^{1}H NMR

(300 MHz, $CDCl_3$) δ 1.72 (s, 3H, O=C*Me*), 2.63 (d, 1H, *J* = 7.1 Hz, O=CC*H*), 3.18 (d, 1H, *J* = 7.1 Hz, PhC*H*), 3.71 and 3.80 (ABq, 2H, *J* = 13.5 Hz, PhCH_2N), 7.18–7.46 (m, 10H, Ar-H); ^{13}C NMR δ 28.5, 48.7, 52.8, 63.9, 127.4, 127.5, 127.7, 128.1, 128.2, 128.5, 135.2, 137.9, 205.9.

(2*R, 3*S**)-1-Benzyl-3-phenyl-2-(trimethylsilyl)-2-[(trimethylsilyl)carbonyl]-aziridine** (**2g**). 56% yield (28 mg); IR (film) 2953, 1626, 1250 cm^{-1}; ^{1}H NMR δ 0.03 (s, 9H, Si*Me*$_3$), 0.32 (s, 9H, Si*Me*$_3$), 3.27 (s, 1H, PhC*H*), 3.49 and 4.54 (ABq, 2H, *J* = 12.4 Hz, PhCH_2N), 6.92–7.48 (m, 10H, Ar-H); ^{13}C NMR δ -2.0, 1.2, 54.1, 58.0, 60.7, 126.6, 127.3, 127.7, 127.8, 128.0, 128.5, 137.2, 139.4, 249.2.

(2*R, 3*S**)-1-Benzyl-3-isopropyl-2-(trimethylsilyl)-2-[(trimethylsilyl)-carbonyl]aziridine** (**2h**). 92% yield (67 mg); IR (film) 2955, 1627, 1250, 1069 cm^{-1}; ^{1}H NMR δ 0.23 (s, 18H, Si*Me*$_3$ x 2), 0.46 (d, 3H, *J* = 6.1 Hz, (CH_3)$_2$C), 0.7–0.9 (m, 4H, (CH_3)$_2$C, (CH$_3$)$_2$C*H*), 1.68 (d, 1H, *J* = 8.8 Hz, BnNC*H*), 3.15 and 4.40 (ABq, 2H, *J* = 12.4 Hz, PhCH_2N), 7.27–7.42 (m, 5H, Ar-H); ^{13}C NMR δ -1.6, 1.1, 18.3, 21.2, 30.8, 56.1, 60.6, 60.8, 127.1, 128.2, 128.8, 139.8, 250.4.

(2*S,3*S**)-1-Benzyl-3-isopropyl-2-(pentanoyl)aziridine** (**2i**). 63% yield (34 mg); **3i** in 4% yield (2 mg); ^{1}H NMR δ 0.79 (d, 3H, *J* = 6.9 Hz, (CH_3)$_2$C), 0.87 (t, 3H, 7.14 Hz, CH$_2$C*H*3), 0.90 (d, 3H, *J* = 6.6 Hz, (CH_3)$_2$C), 1.21–1.34 (m, 2H, CH_2CH$_3$), 1.37–1.57 (m, 3H, (CH$_3$)$_2$C*H*, CH_2CH$_2$CH$_3$), 1.68 (dd, 1H, *J* = 7.0 Hz, 9.3 Hz, (CH$_3$)$_2$CC*H*), 2.35 (d, 1H, *J* = 7.0 Hz, O=CC*H*), 2.39–2.58 (m, 2H, O=CCH_2) 3.43 and 3.60 (ABq, 2H, *J* = 13.2 Hz, PhCH_2N), 7.2–7.4 (m, 5H, Ar-H); ^{13}C NMR δ 13.8, 19.8, 20.9, 22.3, 25.7, 27.2, 41.9, 49.6, 55.7, 64.6, 127.2, 128.3, 128.4, 138.0, 208.9.

(2*S,3*S**)-1-Benzyl-2-formyl-3-(isopropyl)aziridine** (**2j**). 39% yield (28 mg); ^{1}H NMR δ 0.95 (d, 3H, *J* = 6.3 Hz, (CH_3)$_2$C), 0.95 (d, 3H, *J* = 6.9 Hz, (CH_3)$_2$C), 1.58–1.72 (m, 1H, (CH$_3$)$_2$C*H*), 1.84 (dd, 1H, *J* = 6.9 Hz, 9.9 Hz, (CH$_3$)$_2$CC*H*), 2.24–2.28 (m 1H, O=CC*H*), 3.50 and 3.74 (ABq, 2H, *J* = 12.9 Hz, PhCH_2N), 7.32–7.45 (m, 5H, Ar-H), 9.39 (d, 1H, *J* = 5.8 Hz, O=C*H*); ^{13}C NMR δ 19.6, 21.2, 28.9, 49.9, 55.5, 64.1, 127.5, 128.5, 128.5, 137.8, 201.3.

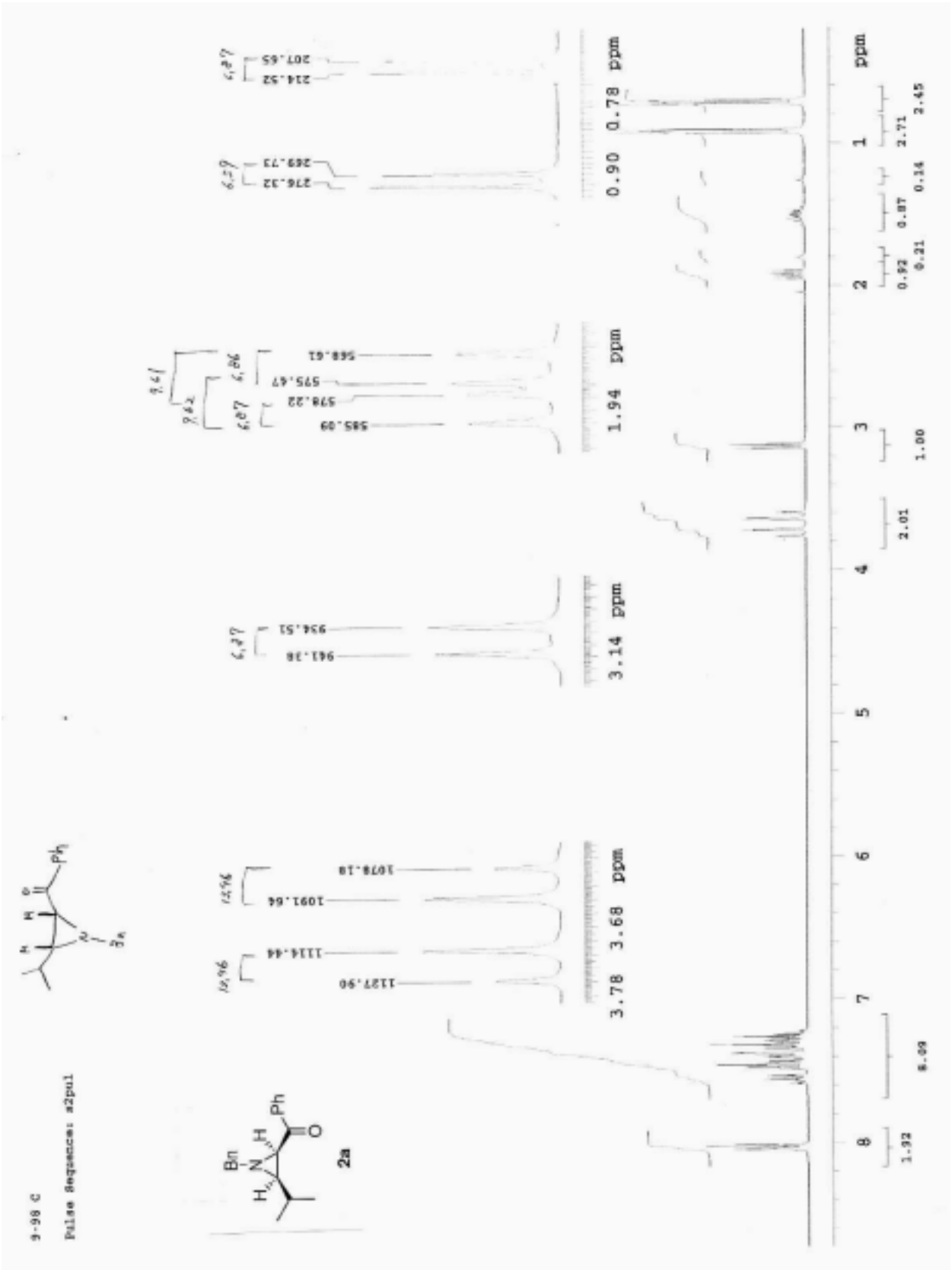
(2*S*,3*S*)-2-Pentanoyl-3-phenyl-1-[(1*S*)-1-phenylethyl]aziridine (**2k**). 64% yield (18 mg); $[\alpha]_D^{28}$ –42.1 (c 0.78, $CHCl_3$); ^{1}H NMR δ 0.73 (t, 3H, *J* = 7.1 Hz, CH$_2$CH_3),

0.98–1.13 (m, 2H, C*H*$_2$CH$_3$), 1.15–1.45 (m, 2H, C*H*$_2$CH$_2$CH$_3$), 1.52 (d, 3H, *J* = 6.3 Hz, Ph*Me*CH), 1.85–1.95 (m, 1H, CH*H*(CH$_2$)$_2$CH$_3$), 2.26–2.36 (m, 1H, C*H*H(CH$_2$)$_2$CH$_3$), 2.62 (d, 1H, *J* = 7.4 Hz, OC=C*H*), 2.79–2.85 (m, 2H, PhC*H*Me), 3.07 (d, 1H, *J* = 7.4 Hz, NC*H*), 7.10–7.55 (m, 10H, Ar-H); ^{13}C NMR δ 13.7, 22.0, 22.8, 25.1, 40.4, 48.3, 52.5, 69.9, 127.0, 127.2, 127.4, 127.7, 128.0, 128.5, 135.4, 143.5, 208.1.; exact mass, m/z 307.1931 (calcd for $C_{21}H_{25}NO$ m/z 307.1936).

(2*R,3*S**)-2-Benzoyl-1-benzyl-3-(3-benzyloxy)propyl-2-[(*tert*-butyldimethylsilyloxy)methyl]aziridine** (**2l**). 90% yield (49 mg); ^{1}H NMR δ –0.09 (s, 3H, *tert*-BuSiC*H*$_3$CH$_3$) 0.02 (s, 3H, *tert*-BuSiCH$_3$C*H*$_3$), 0.81 (s, 9H, (C*H*$_3$)$_3$CSi), 0.99–1.58 (m, 4H, BnOCH$_2$C*H*$_2$C*H*$_2$), 1.88–1.92 (m, 1H, NC*H*), 3.22–3.33 (m, 2H, BnOCH$_2$), 3.51 and 4.42 (ABq, 2H, *J* = 12.4 Hz, PhC*H*$_2$N), 3.91 and 4.56 (ABq, 2H, *J* = 11.5 Hz, C*H*$_2$OTBS), 4.35 (s, 2H, PhC*H*$_2$O), 7.22–8.15 (m, 15H, Ar-H); ^{13}C NMR δ -5.8, -5.8, 18.0, 25.7, 27.2, 27.6, 47.9, 55.7, 56.0, 61.7, 69.6, 72.5, 127.0, 127.4, 127.6, 127.8, 128.2, 128.6, 129.0, 129.8, 123.5, 137.2, 138.5, 139.3, 200.3.; exact mass, m/z 529.3017 (calcd for $C_{33}H_{43}NO_3Si$ m/z 529.3012).

(2*S*, 3*S*)-2-Benzoyl-1-benzyl-2-(*tert*-butyldimethylsilyloxy)methyl-3-[(1*S*)-1-(methoxymethoxy)ethyl]aziridine (**2m**). 37% yield (7.2 mg); $[\alpha]_D^{30}$ +22.0 (c 0.35, $CHCl_3$); ^{1}H NMR δ –0.08 (s, 3H, *tert*-BuSiCH$_3$C*H*$_3$) 0.04 (s, 3H, *tert*-BuSiC*H*$_3$CH$_3$), 0.80 (s, 9H, (C*H*$_3$)$_3$CSi), 1.16 (d, 3H, *J* = 6.3 Hz, *Me*CH), 1.96 (d, 1H, *J* =9.8 Hz, NC*H*), 3.02 (s, 3H, *Me*O), 3.00–3.07 (m, ^{1}H, MeC*H*), 3.50 and 4.43 (ABq, 2H, *J* = 12.9 Hz, PhC*H*$_2$N), 3.92 and 4.43 (ABq, 2H, *J* = 11.5 Hz, C*H*$_2$OTBS), 3.95 and 4.61 (ABq, 2H, *J* = 6.9 Hz, MeOC*H*$_2$O), 7.22–7.99 (m, 10H, Ar-H); ^{13}C NMR δ -5.8, -5.7, 18.1, 18.2, 25.7, 52.9, 54.3, 54.9, 56.3, 62.0, 73.2, 95.0, 127.2, 127.7, 128.2, 129.2, 129.9, 132.5, 137.2, 138.8, 199.9.; exact mass, m/z 469.2642 (calcd for $C_{27}H_{39}NO_4Si$ m/z 469.2648).

5-Acetyl-1-benzyl-2-phenyl-3-(ethoxycarbonyl)pyrrole (**5**). A solution of **2f** (27 mg, 0.11 mmol) and ethyl propiolate (0.2 mL) in benzene (3 mL) was heated at 80 ˚C for 12 h. The mixture was concentrated and purified by CC to give **5** (23 mg, 62 %) as a colorless oil. IR (film) 2983, 1705, 1645 cm^{-1}; ^{1}H NMR δ 1.11 (t, 3H, *J* = 7.1 Hz), 2.47 (s, 3H), 4.13 (q, 2H, *J* = 7.1 Hz), 5.47 (s, 2H), 6.75–6.80 (m, 2H), 7.15–7.42 (m, 8H), 7.59 (s, 1H); ^{13}C NMR δ 14.0, 27.5, 49.6, 59.9, 114.4, 121.8, 125.9, 127.0, 128.0, 128.3, 129.1, 129.9, 130.2, 138.1, 145.5, 163.7, 188.6.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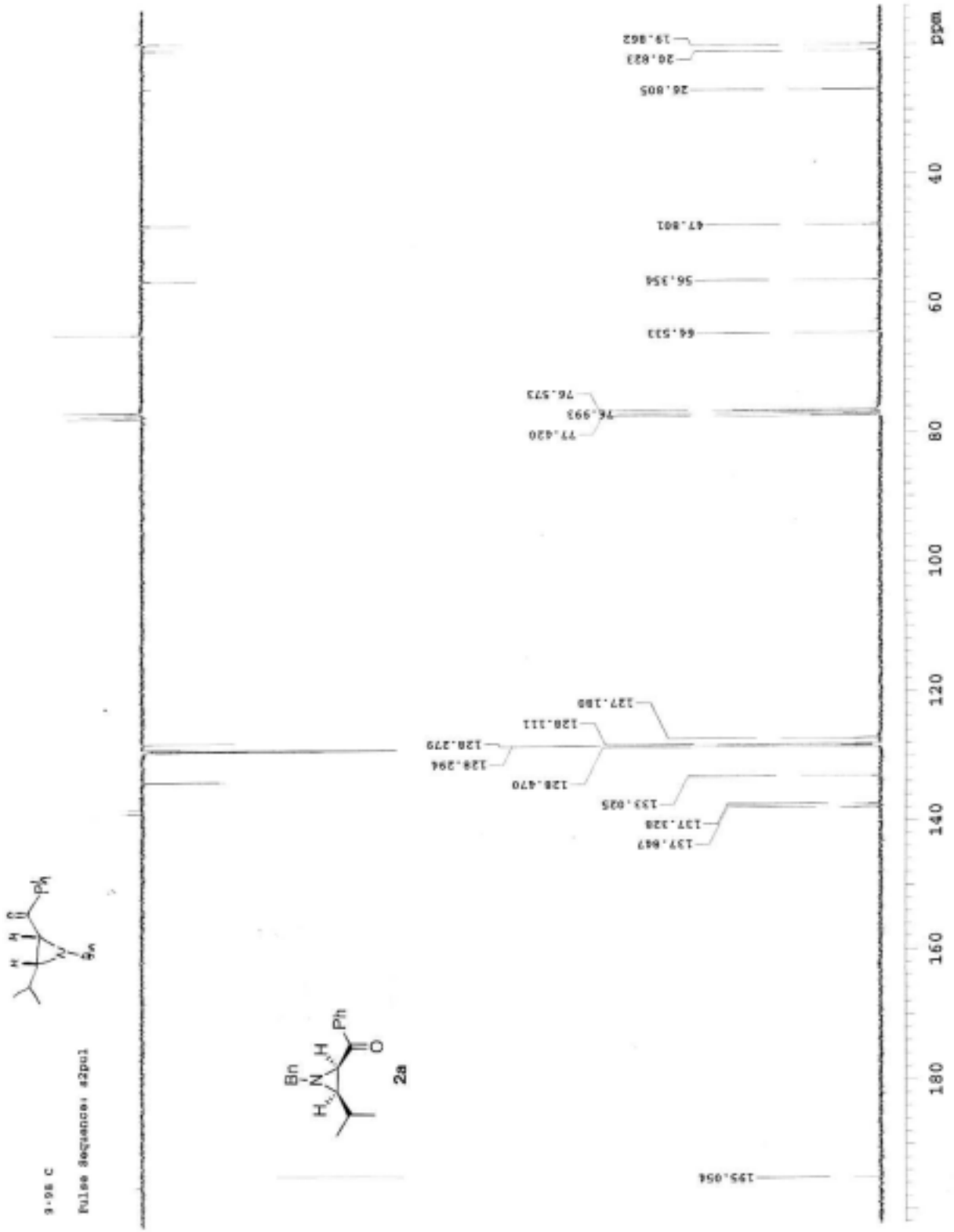
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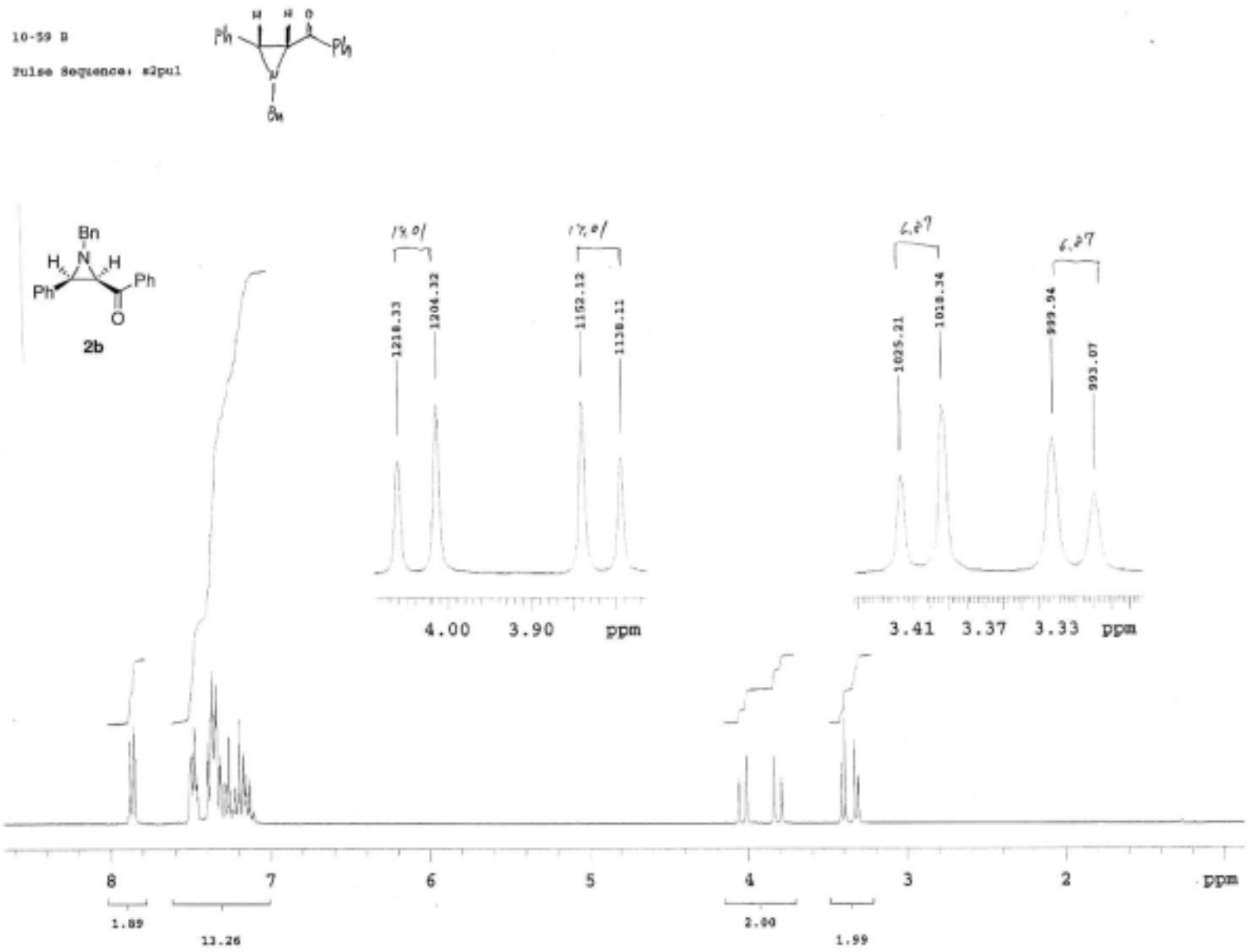
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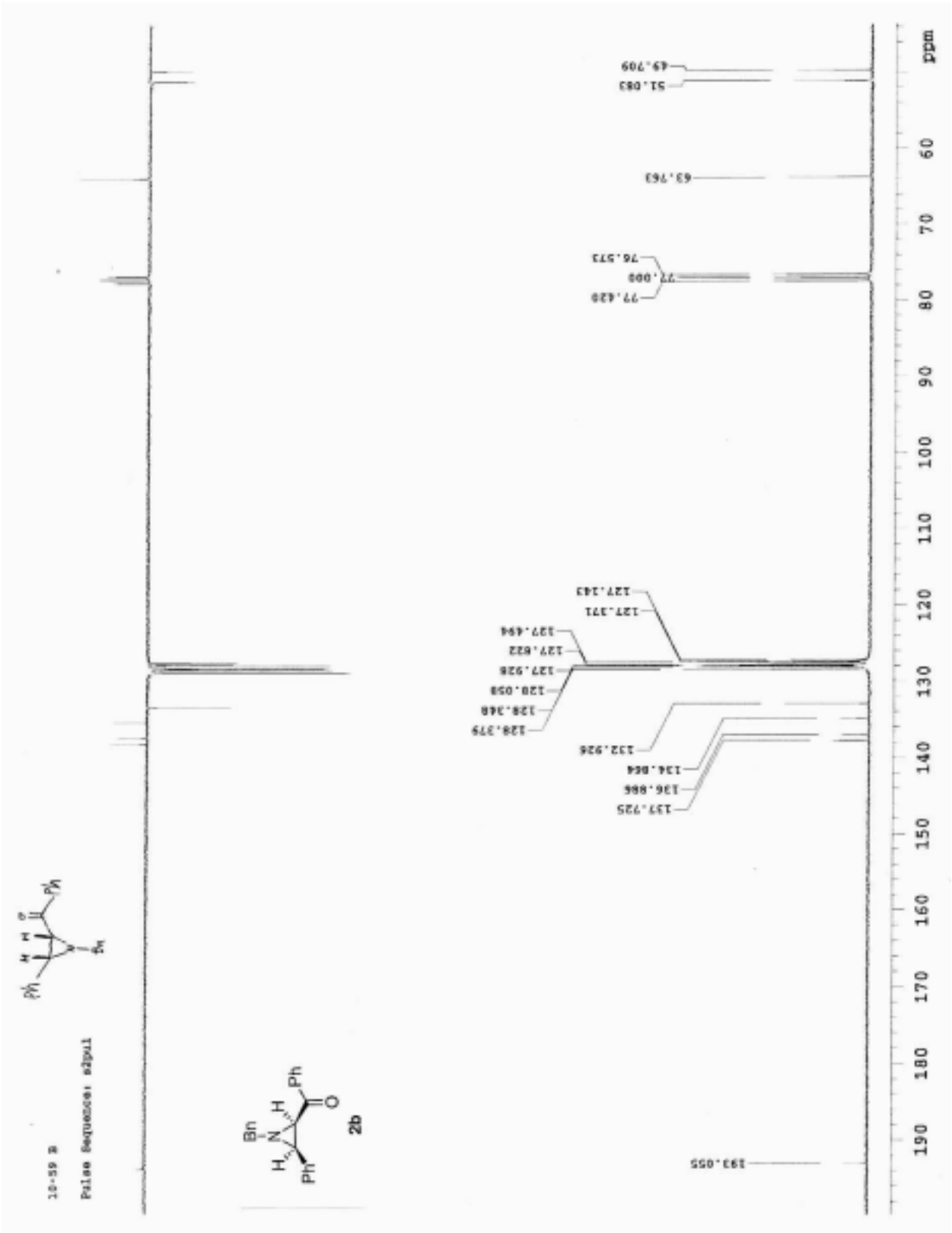
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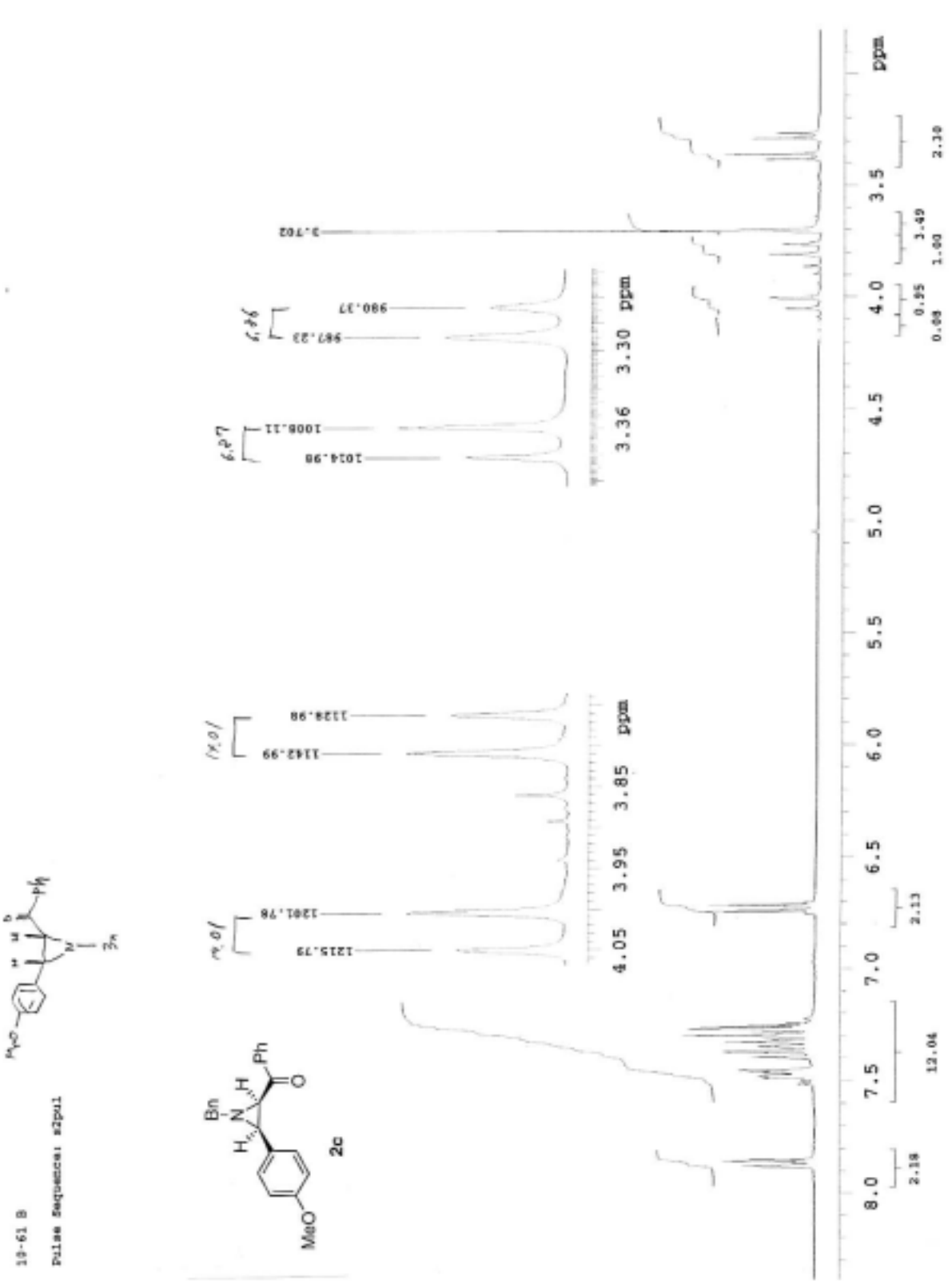
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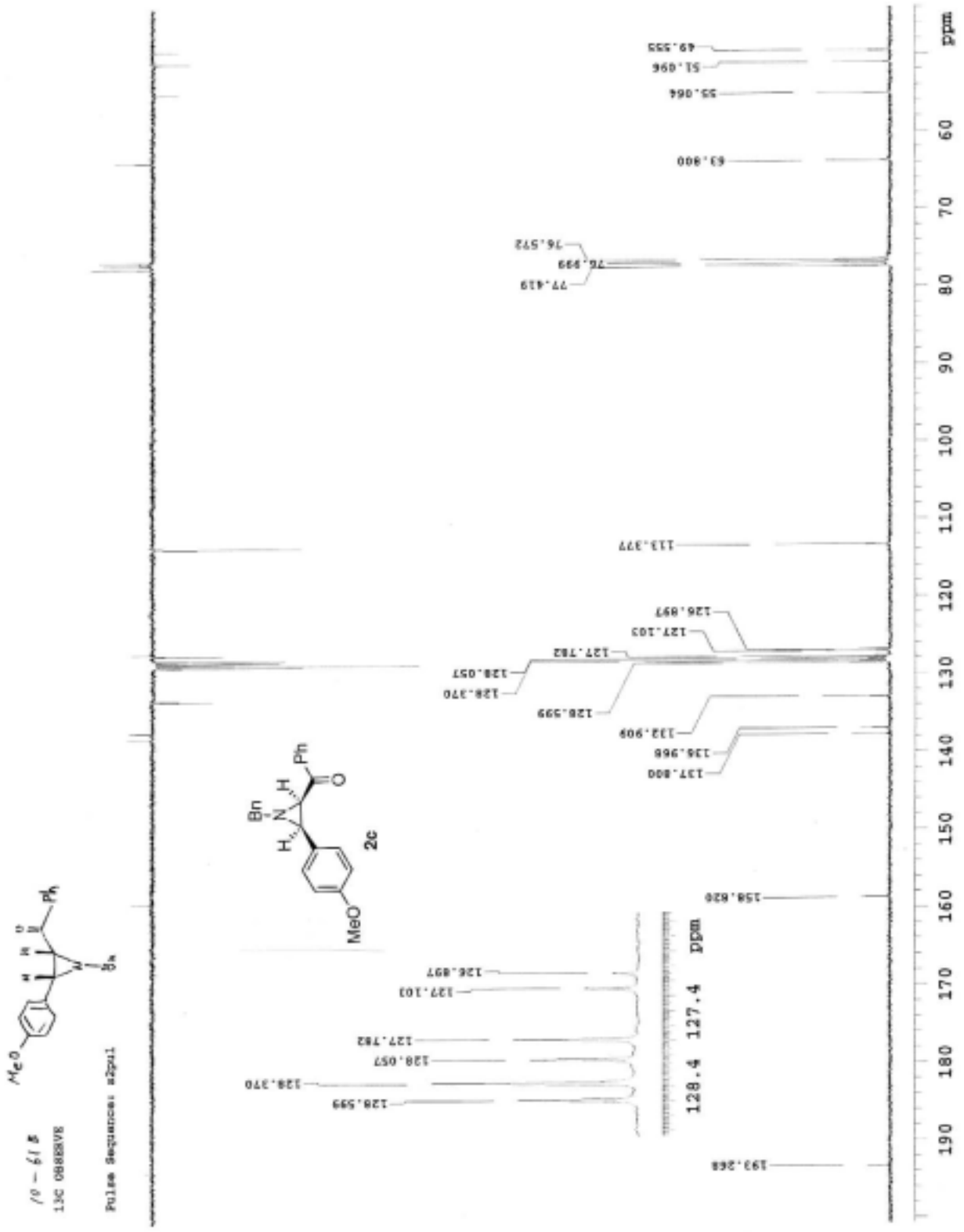
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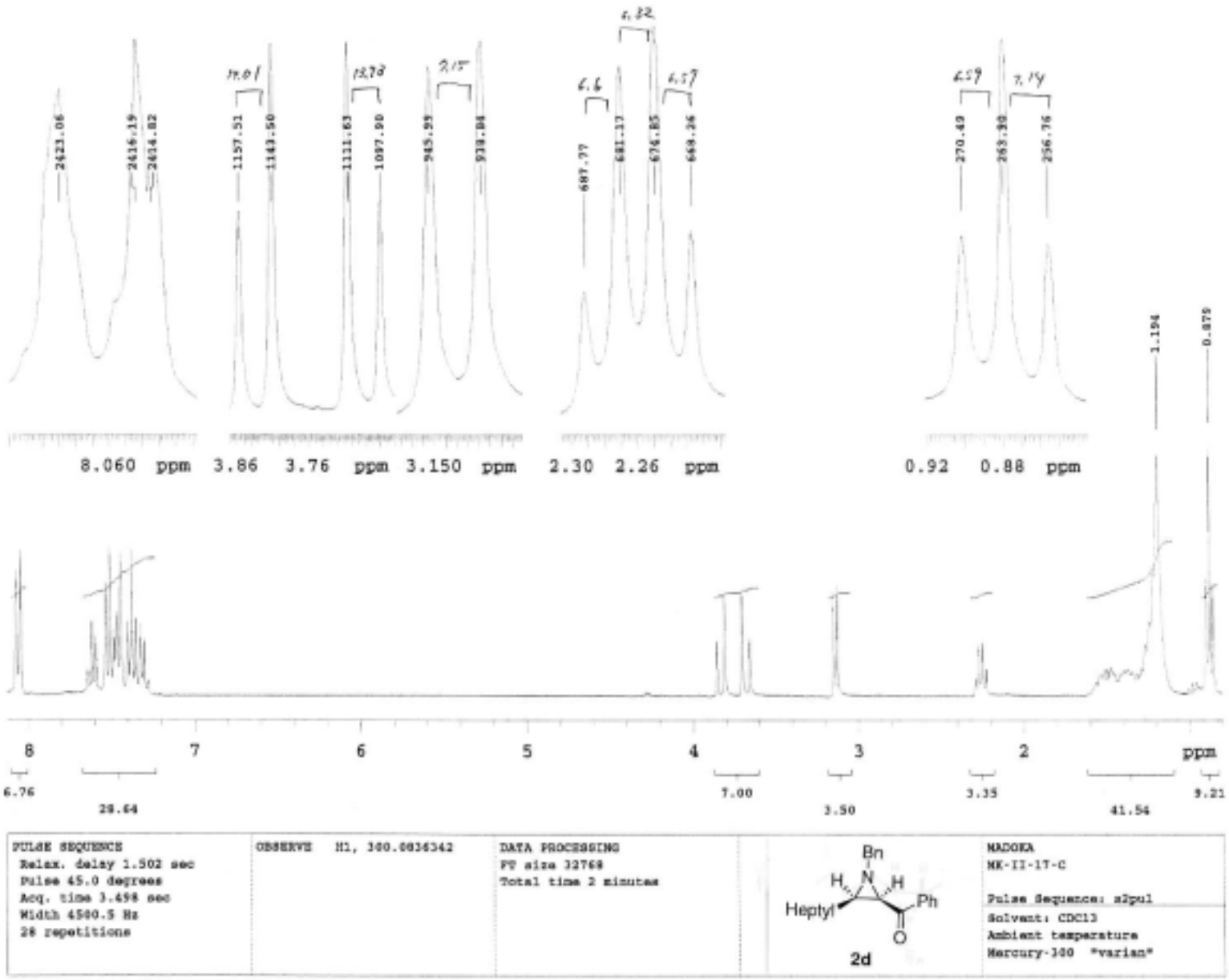
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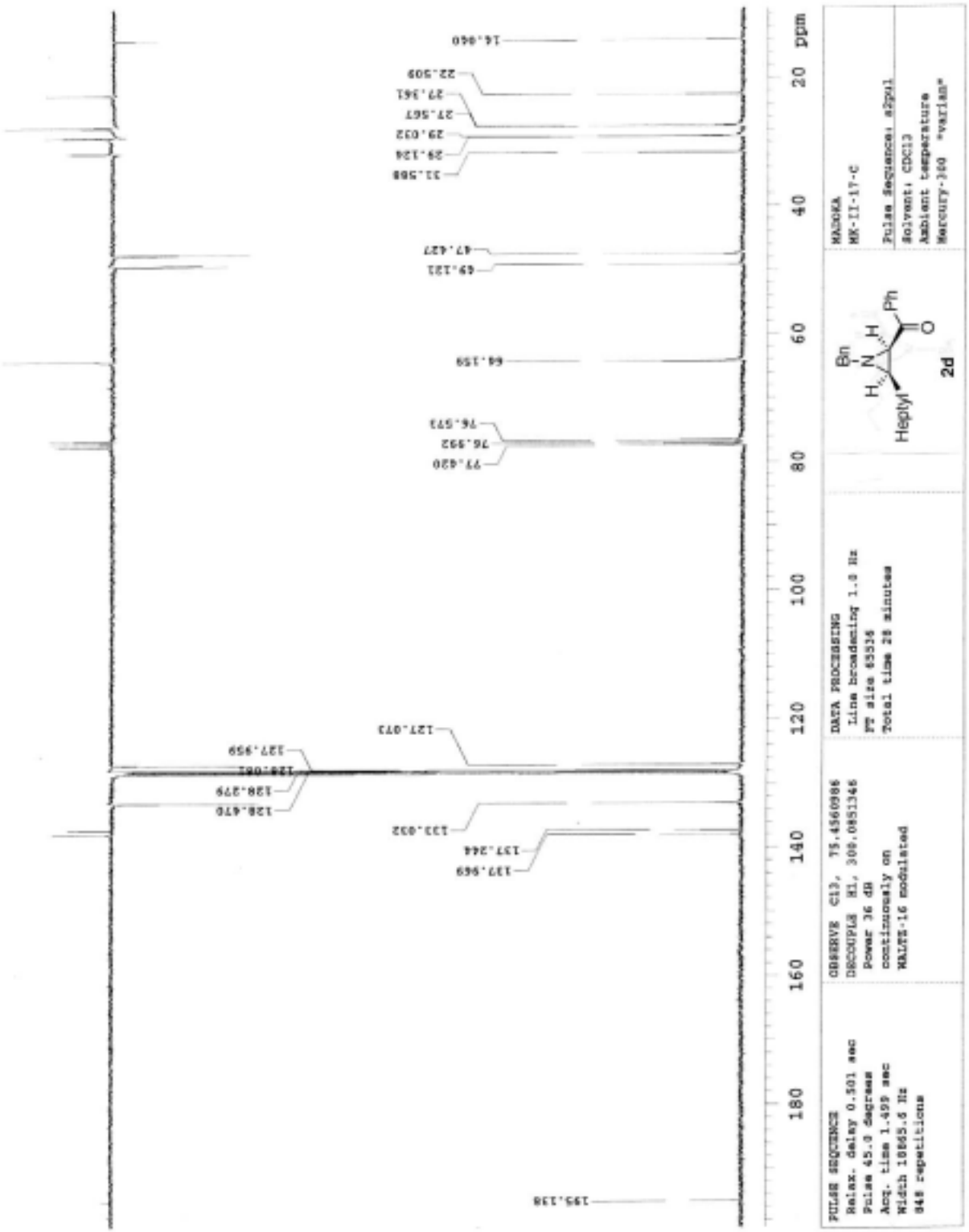
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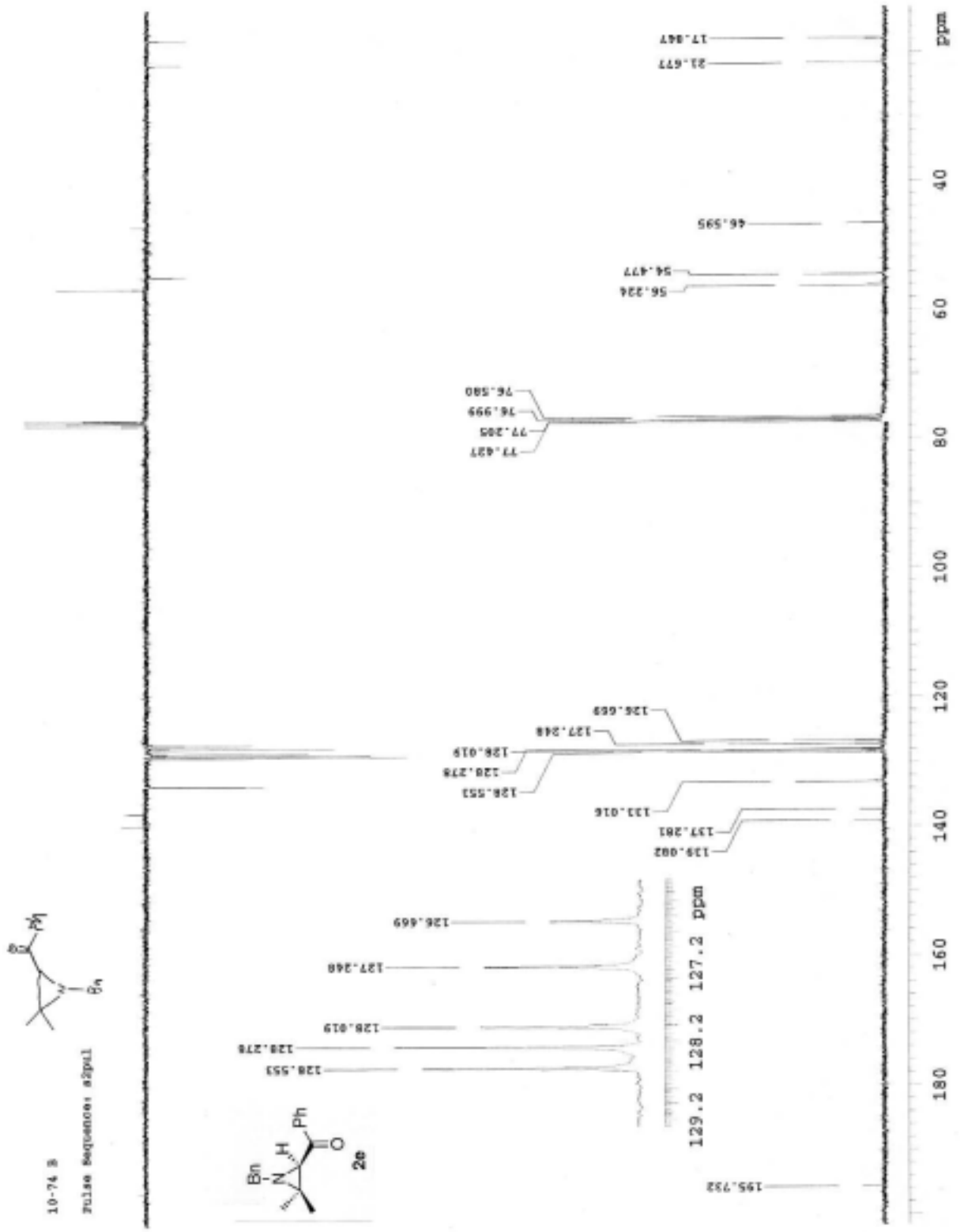
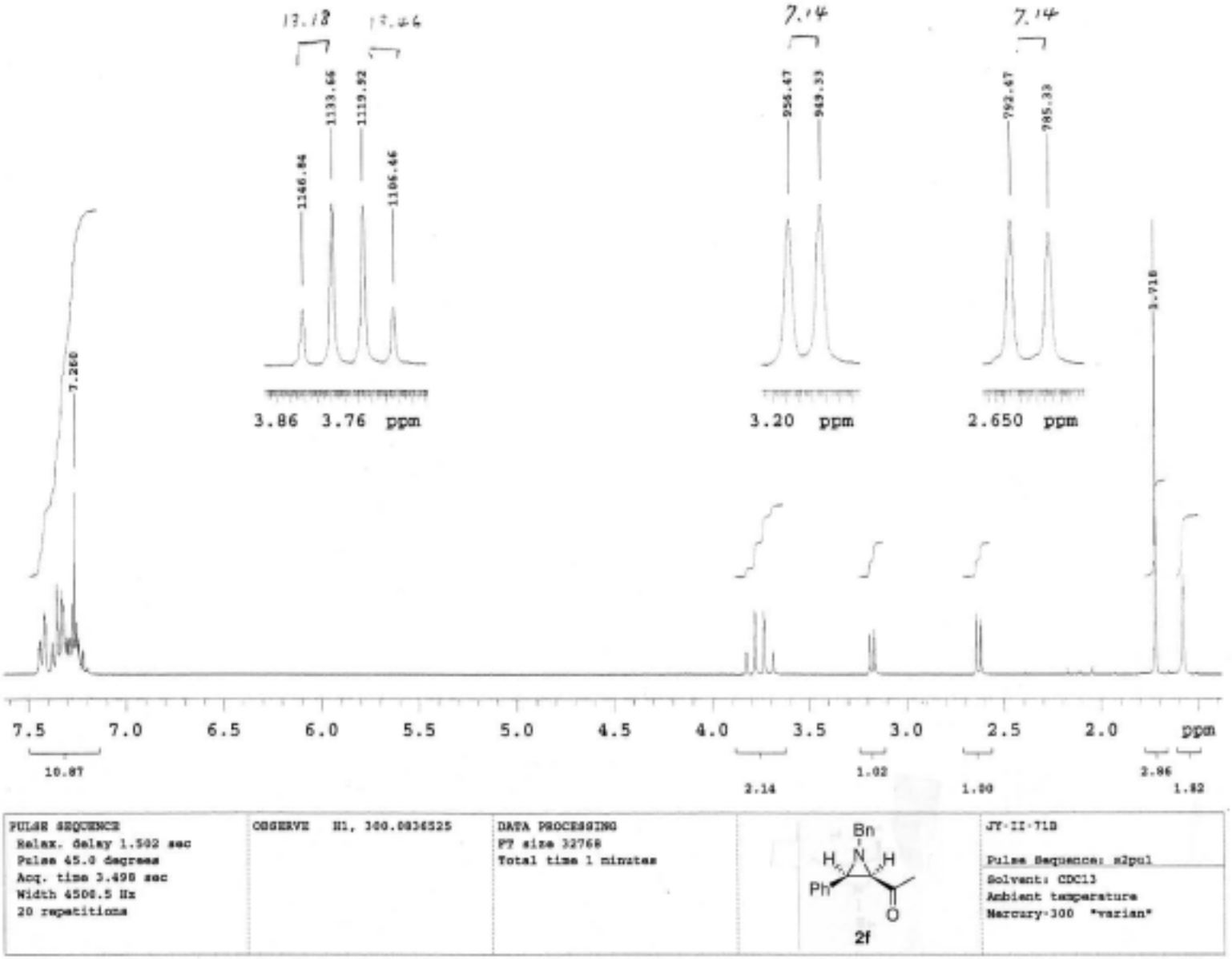
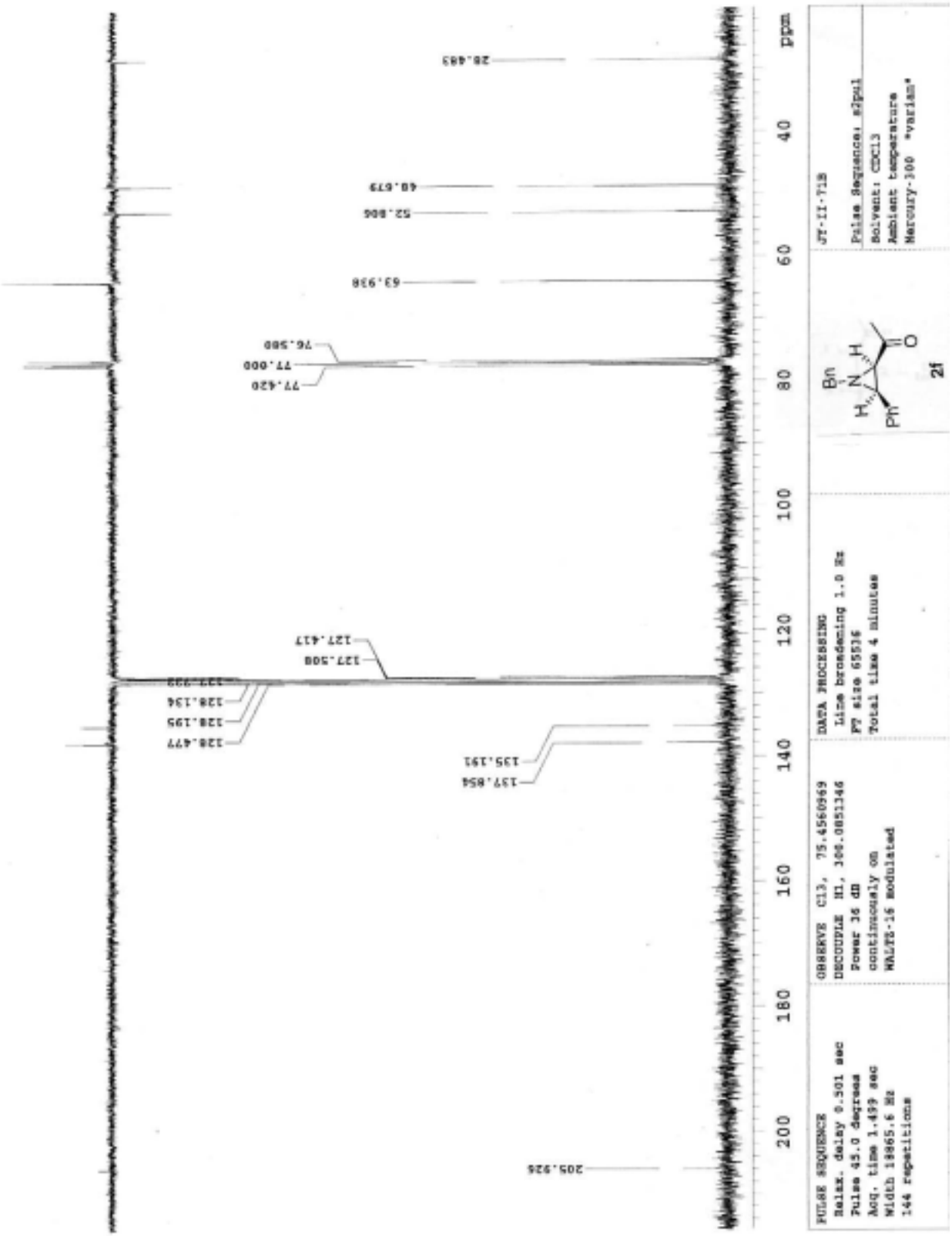
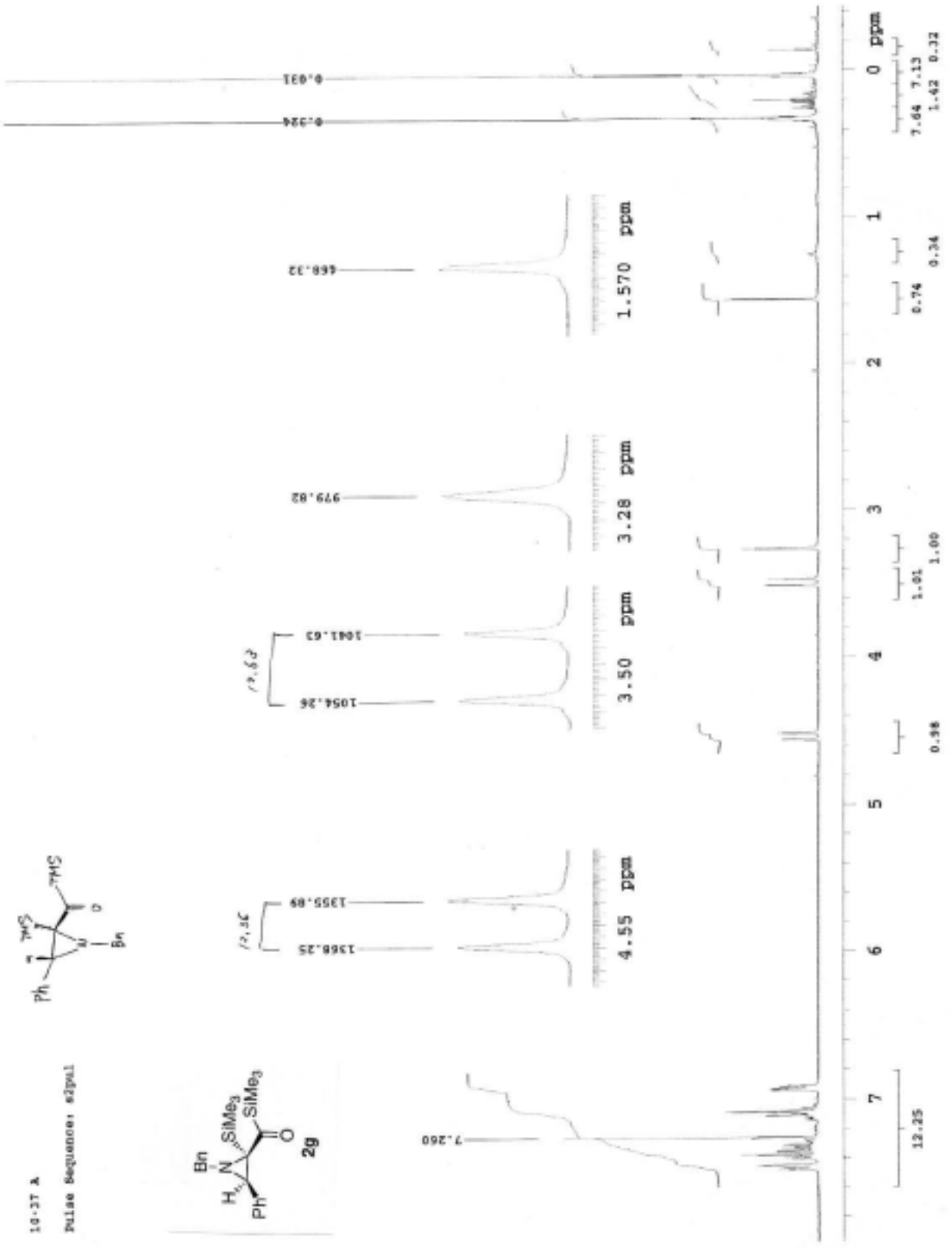
Ambient temperature
Mercury-300 "varian"
DATA PROCESSING
Line broadening 1.0 Hz
FT size 65536
Total time 28 minutes
OBSERVE C13, 75.4560986
DECOUPLE H1, 309.0851346
Power 36 dB
continuously on
WALTZ-16 modulated
PULSE SEQUENCE
Relax. delay 0.501 sec
Pulse 45.0 degrees
Acq. time 1.499 sec
Width 18865.6 Hz
848 repetitions

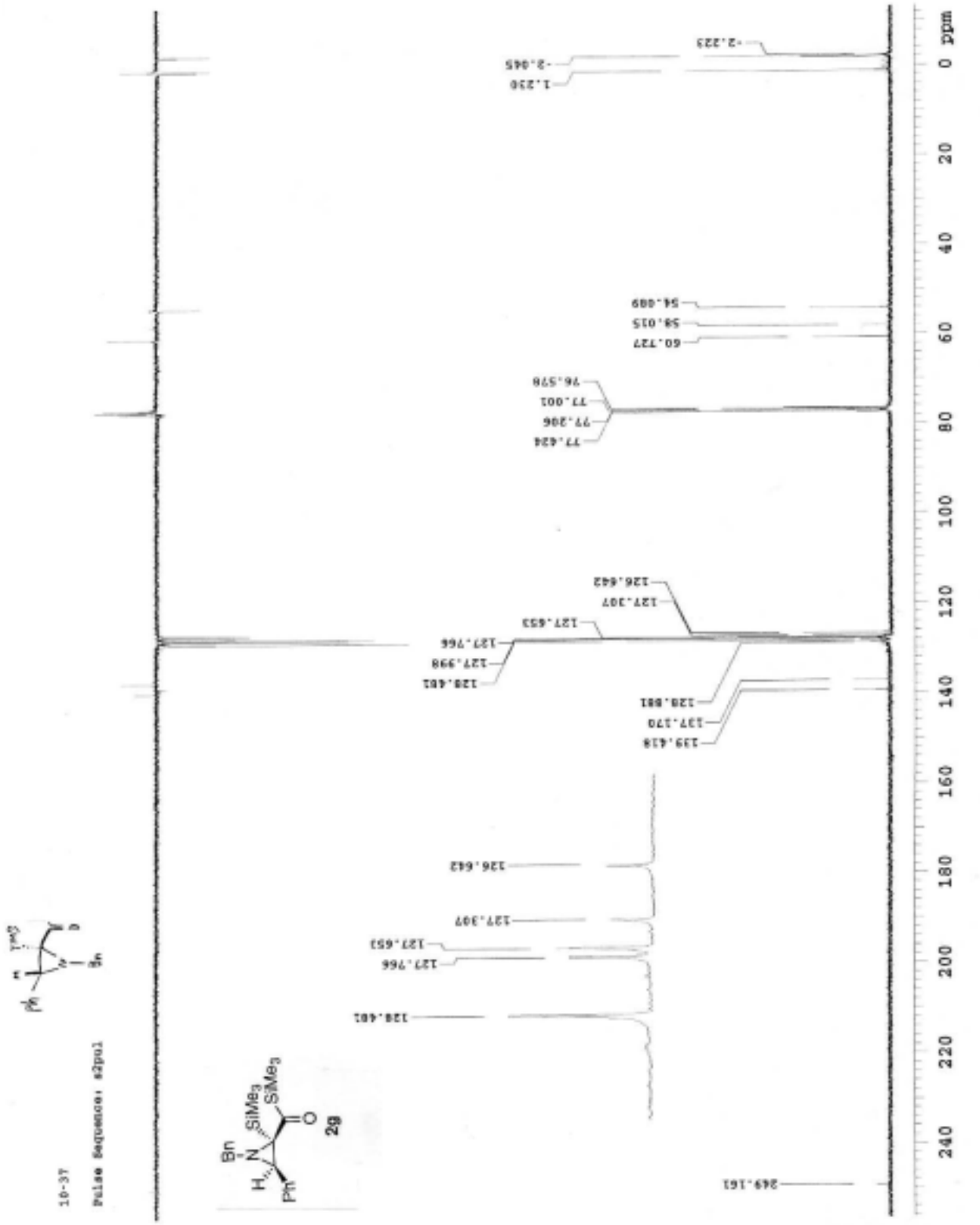

10-74 B
Pulse Sequence: s2pul
Bn
N
H
Ph
O
2e
1190.22
1175.38
1166.59
1152.03
878.43
460.61
363.64
1.535
1.212
3.94
3.88
ppm
2.93
ppm
1.50
1.35
ppm
10.58
2.00
1.00
0.16
2.85
2.77
ppm

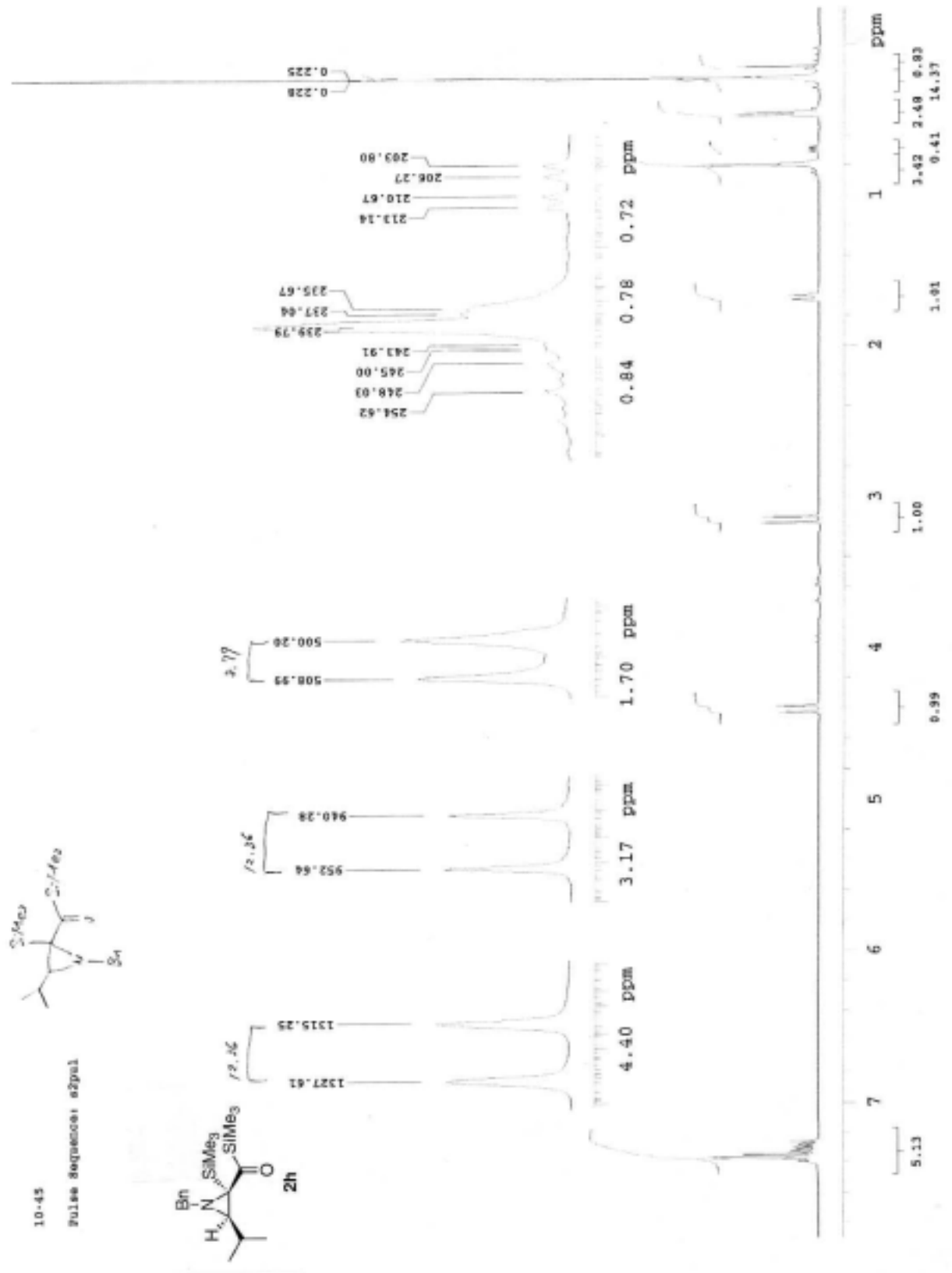

17.847
21.677
46.595
54.477
56.334
76.580
76.999
77.285
77.427
126.669
127.248
128.019
128.278
128.553
133.016
137.281
139.082
195.732
ppm
40
60
80
100
120
140
160
180
126.669
127.248
128.019
128.278
128.553
129.2
128.2
127.2
ppm
Bn
N
H
Ph
O
2e
10-74 B
Pulse Sequence: s2pul

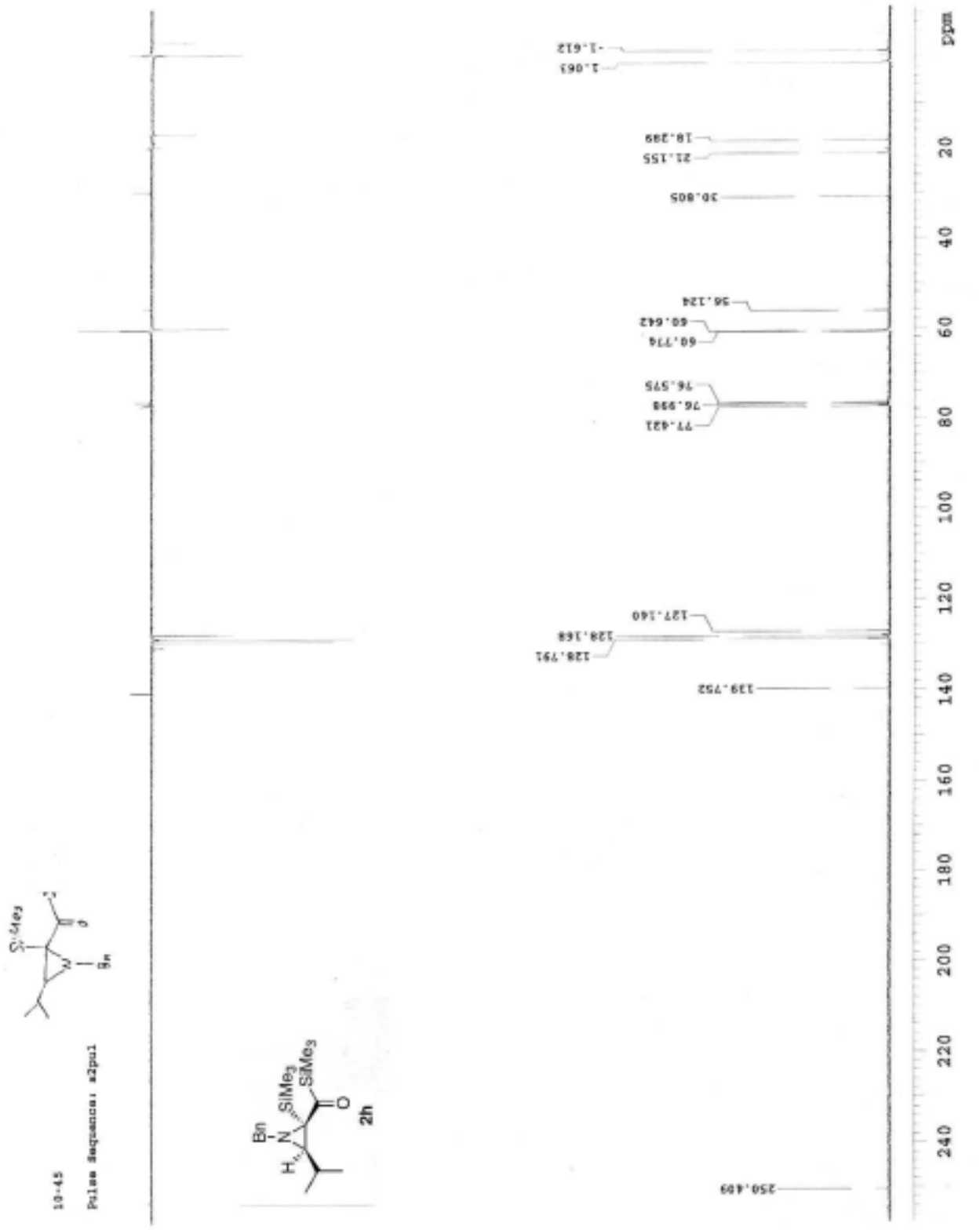

13.18
12.46
7.14
7.14
1146.84
1133.66
1119.52
1105.46
956.47
949.33
792.47
785.33
7.260
1.716
3.86 3.76 ppm
3.20 ppm
2.650 ppm
7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 ppm
10.87
2.14
1.02
1.00
2.86
1.82
PULSE SEQUENCE
Relax. delay 1.502 sec
Pulse 45.0 degrees
Acq. time 3.498 sec
Width 4508.5 Hz
20 repetitions
OBSERVE H1, 300.0836525
DATA PROCESSING
FT size 32768
Total time 1 minutes
Bn
N
H
H
Ph
O
2f
JY-II-71B
Pulse Sequence: s2pul
Solvent: CDCl3
Ambient temperature
Mercury-300 "varian"

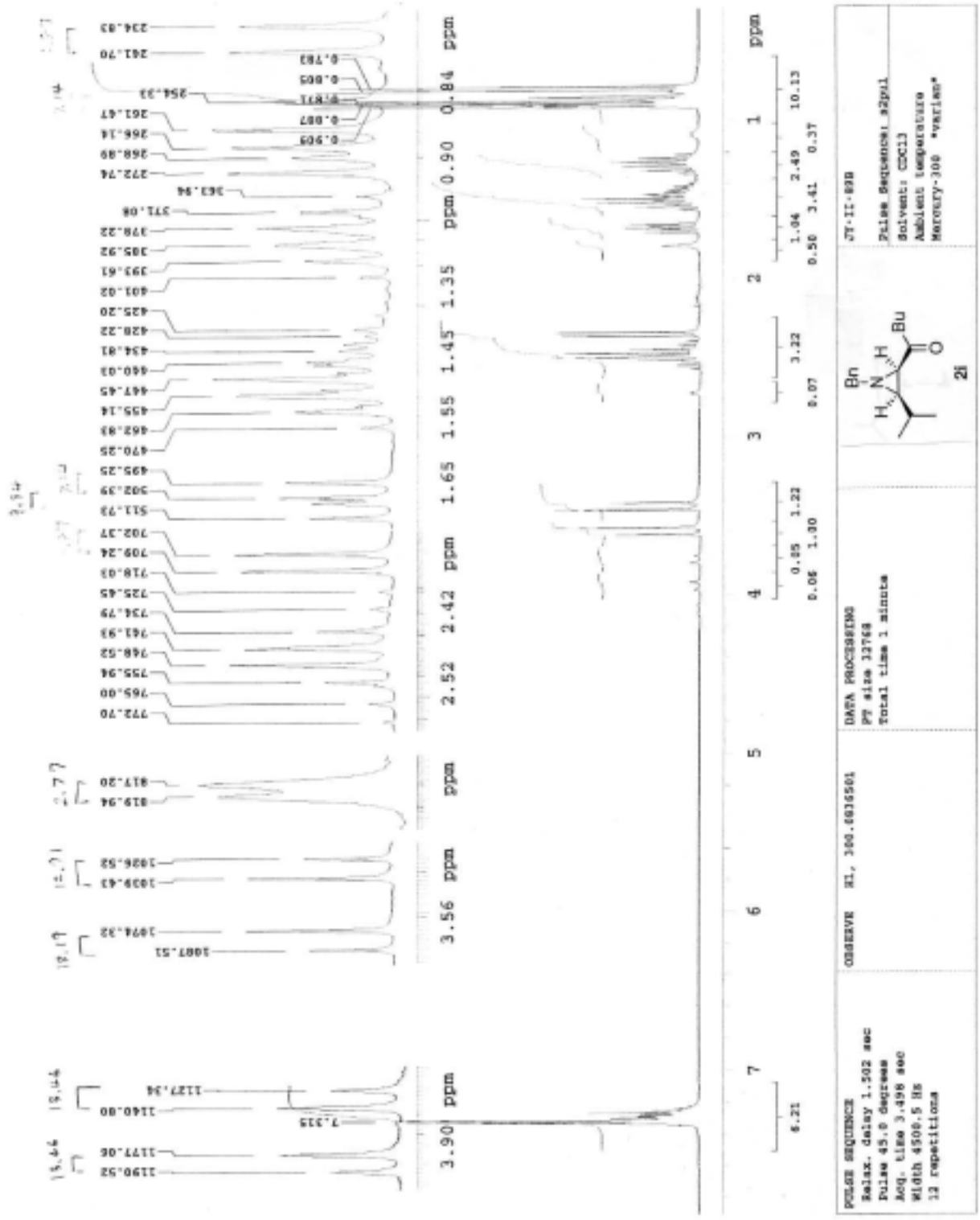

205.926
137.854
135.191
128.477
128.195
128.134
127.508
127.417
77.420
77.000
76.580
63.938
52.806
48.679
28.485
ppm
Bn
Ph
21
JF-II-71B
Pulse Sequence: s2pul
Solvent: CDCl3
Ambient temperature
Mercury-300 "varian"
DATA PROCESSING
Line broadening 1.0 Hz
FT size 65536
Total time 4 minutes
OBSERVE C13, 75.4560969
DECOUPLE H1, 300.0851346
Power 36 dB
continuously on
WALTZ-16 modulated
PULSE SEQUENCE
Relax. delay 0.301 sec
Pulse 45.0 degrees
Acq. time 1.439 sec
Width 19865.6 Hz
144 repetitions

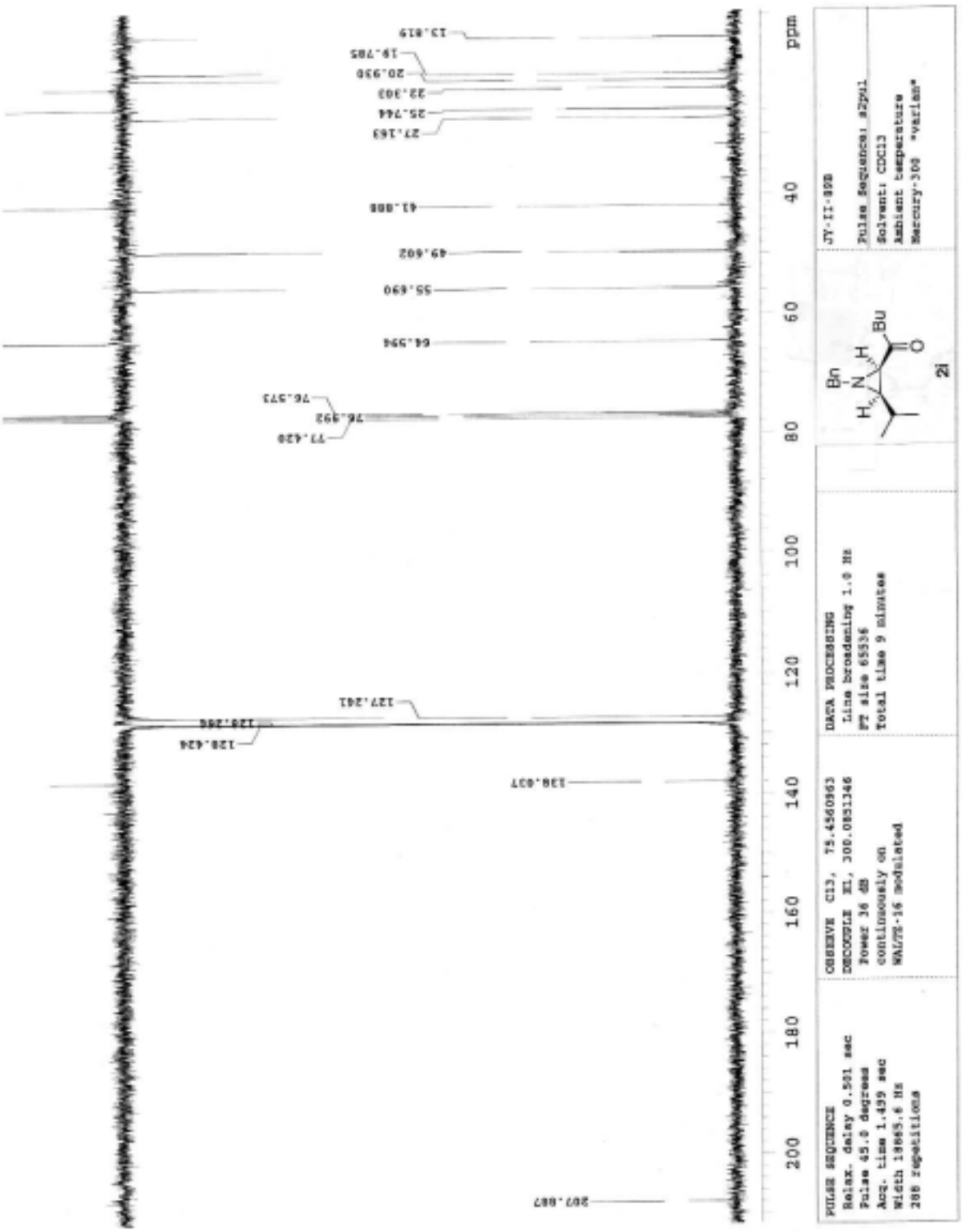

10-37 A
Pulse Sequence: s2pul
Bn
SiMe3
SiMe3
Ph
O
2g
7.260
1368.25
1355.89
4.55 ppm
1054.26
1041.63
3.50 ppm
979.82
3.28 ppm
668.32
1.570 ppm
0.324
0.031
0 ppm

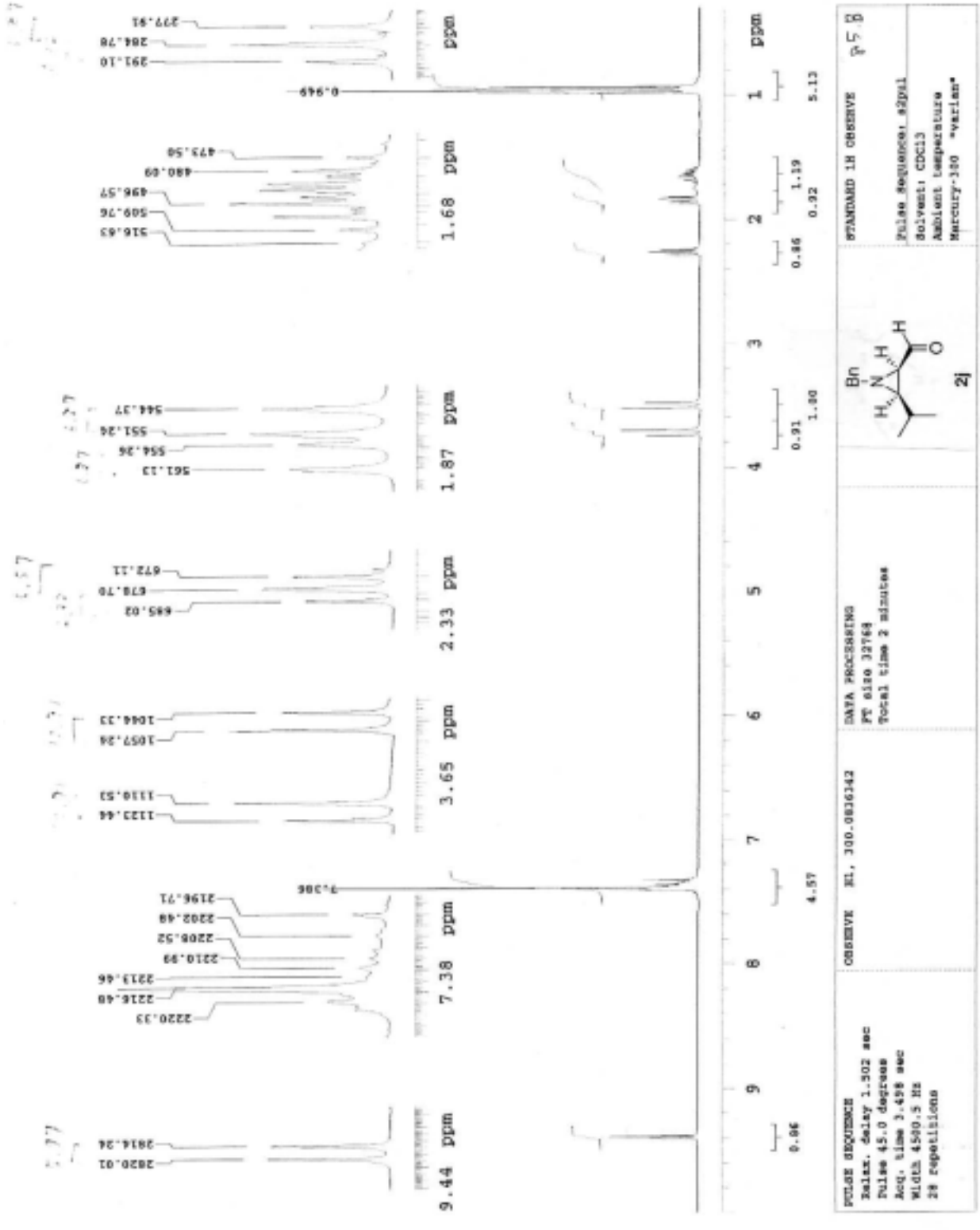

-2.223
-3.065
1.230
54.089
58.015
60.727
76.578
77.001
77.206
77.424
126.642
127.307
127.653
127.766
127.998
128.461
128.881
137.170
139.428
136.642
127.307
127.653
127.766
128.461
349.161
0 ppm
20
40
60
80
100
120
140
160
180
200
220
240
SiMe3
SiMe3
Bn
N
H
Ph
O
2g
10-37
Pulse Sequence: s2pul

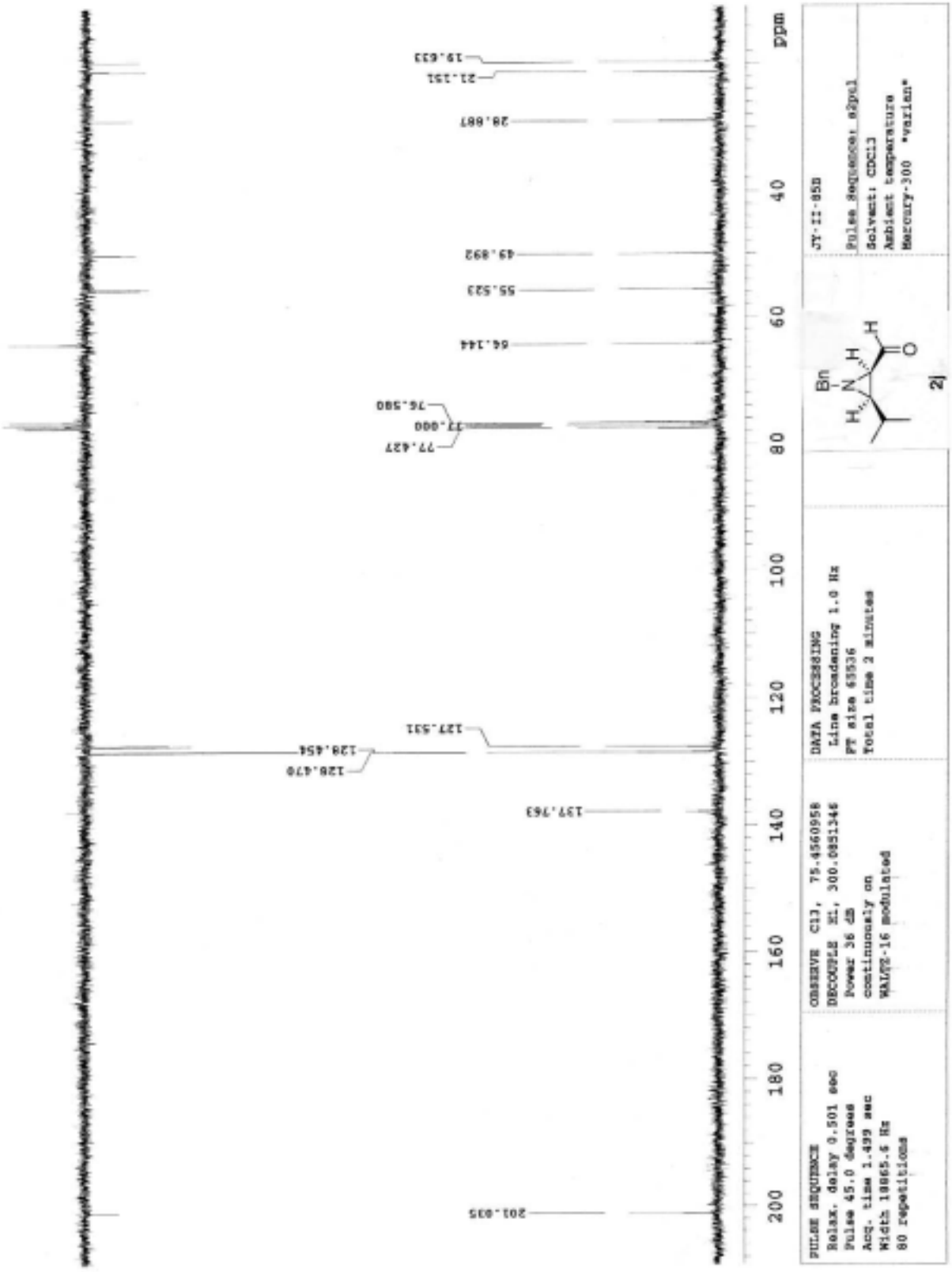

0.225
0.228
203.80
206.27
210.67
213.14
235.67
237.64
239.79
243.91
246.00
248.03
254.62
500.20
508.93
940.28
952.64
1315.25
1327.61
4.40 ppm
3.17 ppm
1.70 ppm
0.84
0.78
0.72 ppm
ppm
10-43
Pulse Sequence: s2pul
2h

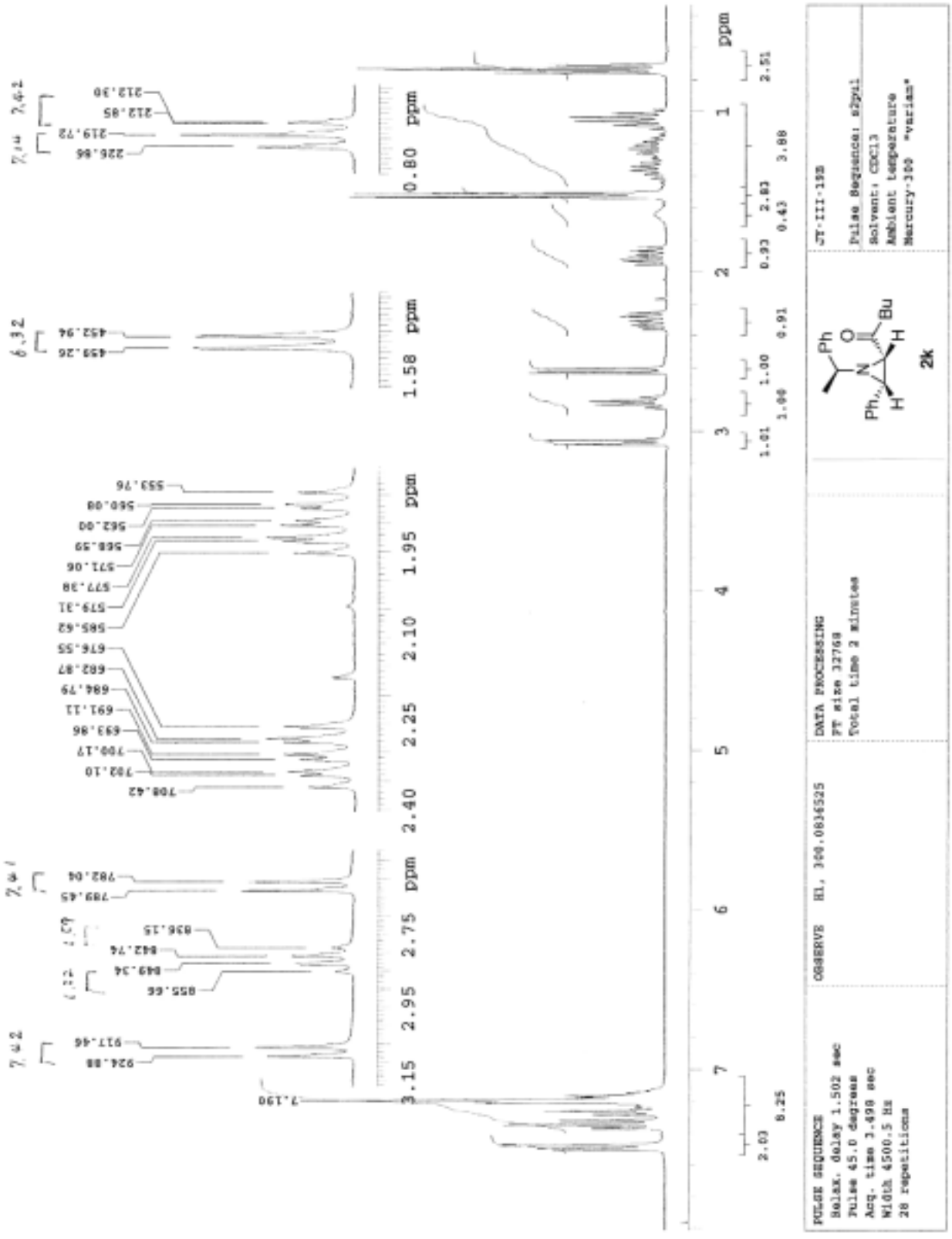

-1.612
1.063
18.289
21.155
30.805
36.124
60.642
60.774
76.575
76.998
77.421
127.160
128.168
128.791
139.752
250.489
ppm
20
40
60
80
100
120
140
160
180
200
220
240
10-45
Pulse Sequence: s2pul
SiMe3
Bn
SiMe3
SiMe3
O
Bn
N
H
2h

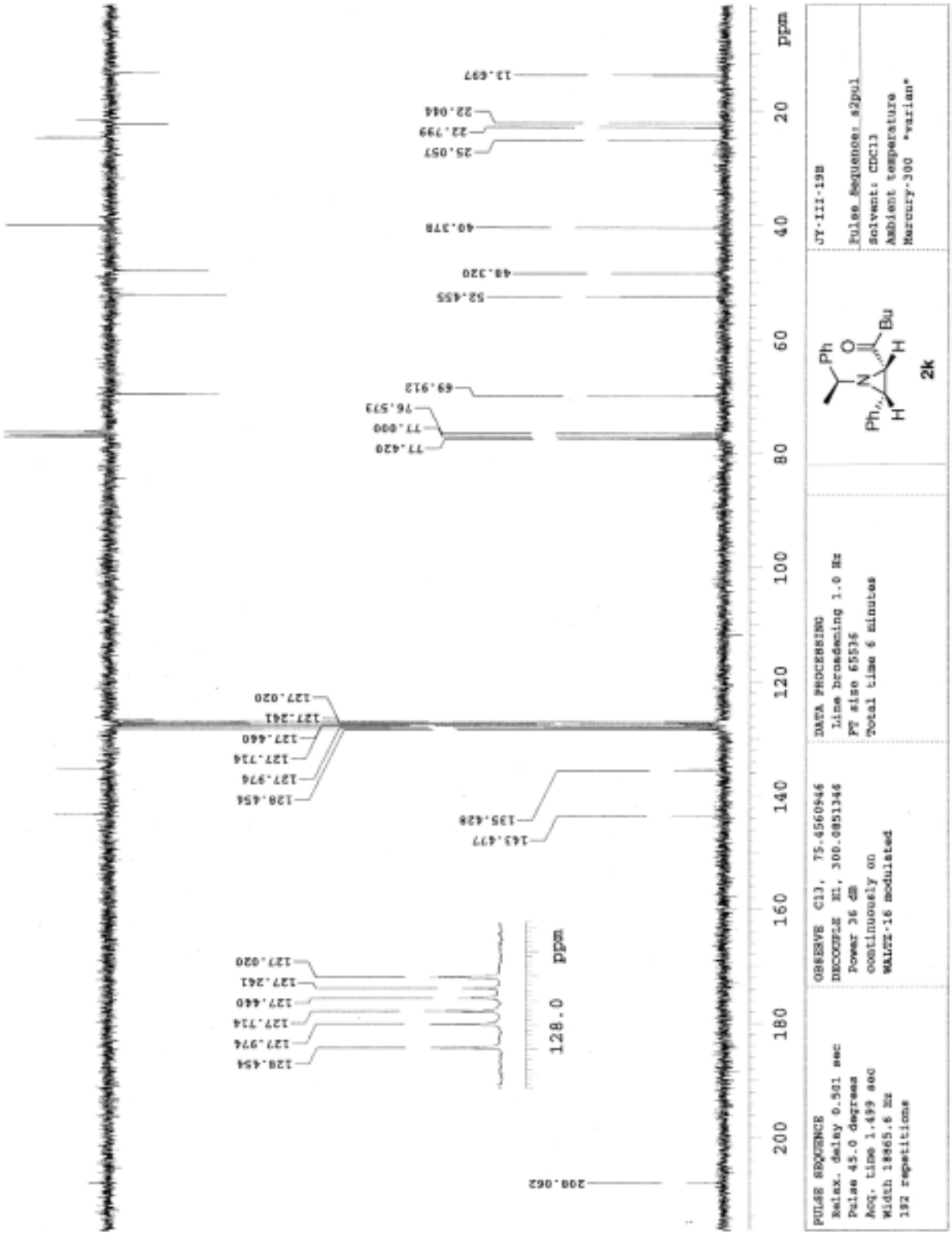


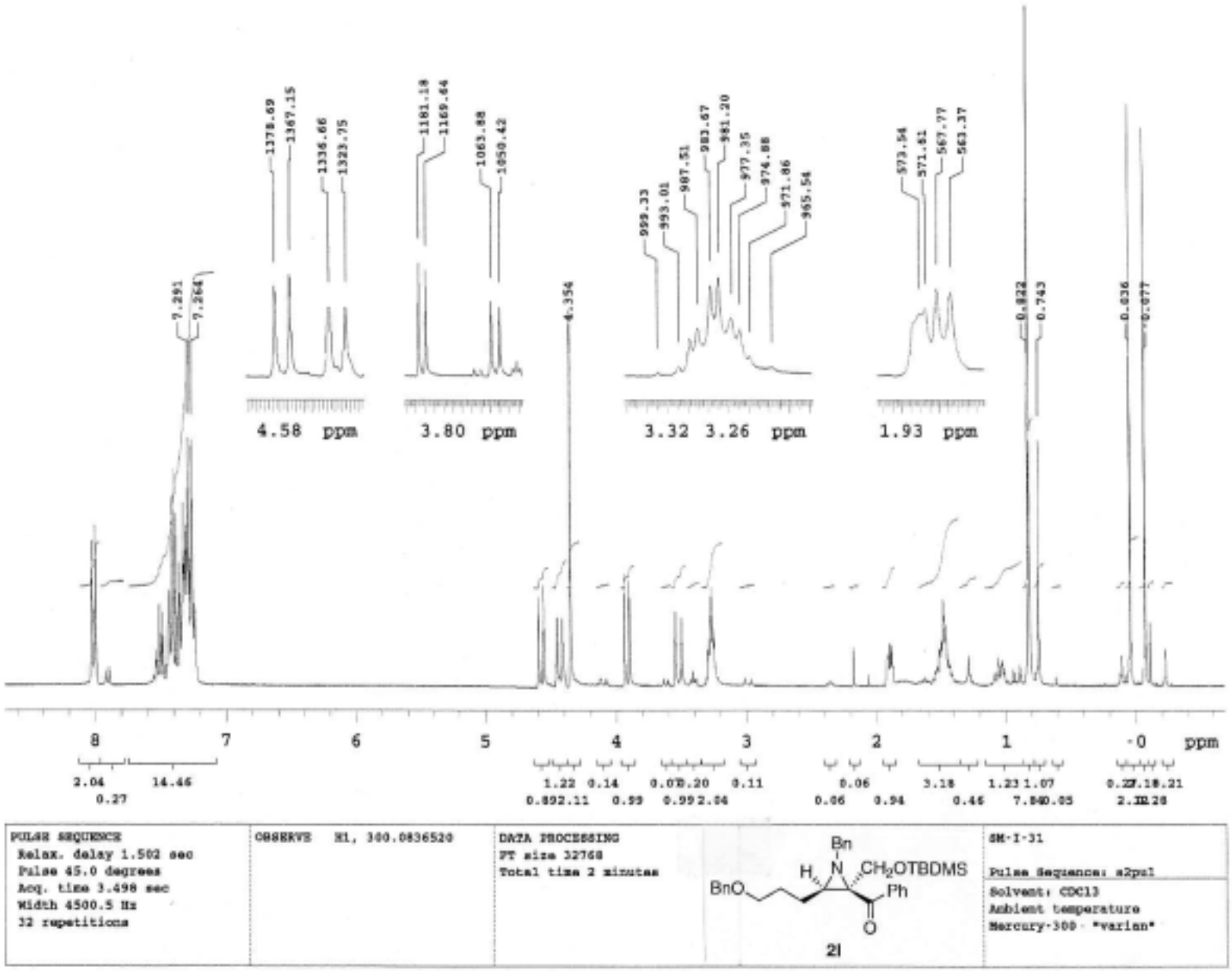

13.819
19.785
20.930
22.303
25.744
27.163
41.888
49.602
55.690
64.594
76.573
76.992
77.420
127.241
128.266
128.434
138.037
207.887
ppm
JY-II-89B
Pulse Sequence: s2pul
Solvent: CDCl3
Ambient temperature
Mercury-300 "varian"
Bn
Bu
2i
DATA PROCESSING
Line broadening 1.0 Hz
FT size 65536
Total time 9 minutes
OBSERVE C13, 75.4560963
DECOUPLE H1, 300.0831346
Power 36 dB
continuously on
WALTZ-16 modulated
PULSE SEQUENCE
Relax. delay 0.501 sec
Pulse 45.0 degrees
Acq. time 1.499 sec
Width 18868.6 Hz
288 repetitions

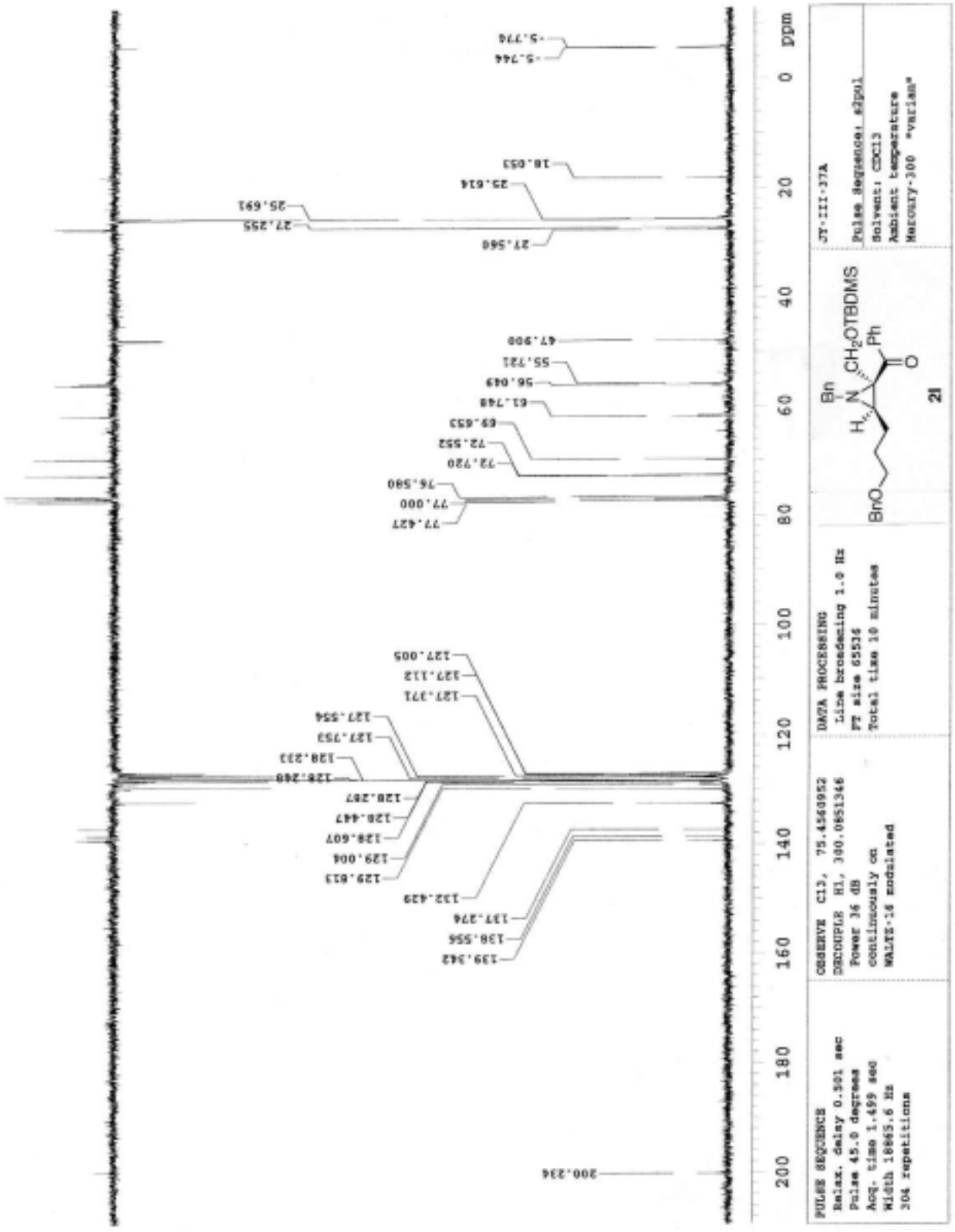


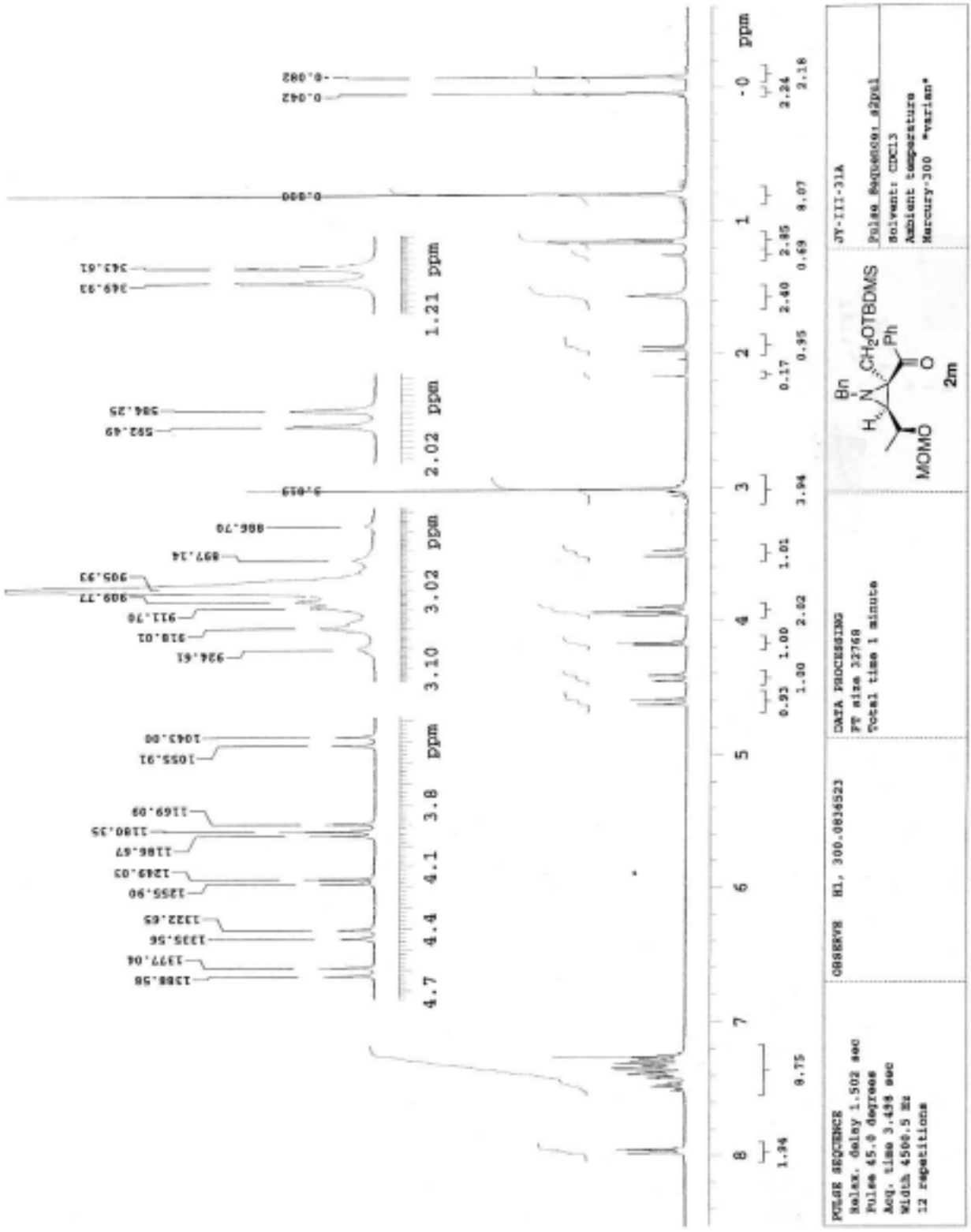

19.633
21.151
28.887
49.892
55.523
64.144
76.580
77.000
77.427
127.531
128.454
128.670
137.763
201.035
ppm
Bn
2j
JY-II-85B
Pulse Sequence: s2pul
Solvent: CDCl3
Ambient temperature
Mercury-300 "varian"
DATA PROCESSING
Line broadening 1.0 Hz
FT size 65536
Total time 2 minutes
OBSERVE C13, 75.4560958
DECOUPLE H1, 300.0851346
Power 36 dB
continuously on
WALTZ-16 modulated
PULSE SEQUENCE
Relax. delay 0.501 sec
Pulse 45.0 degrees
Acq. time 1.499 sec
Width 18865.6 Hz
80 repetitions

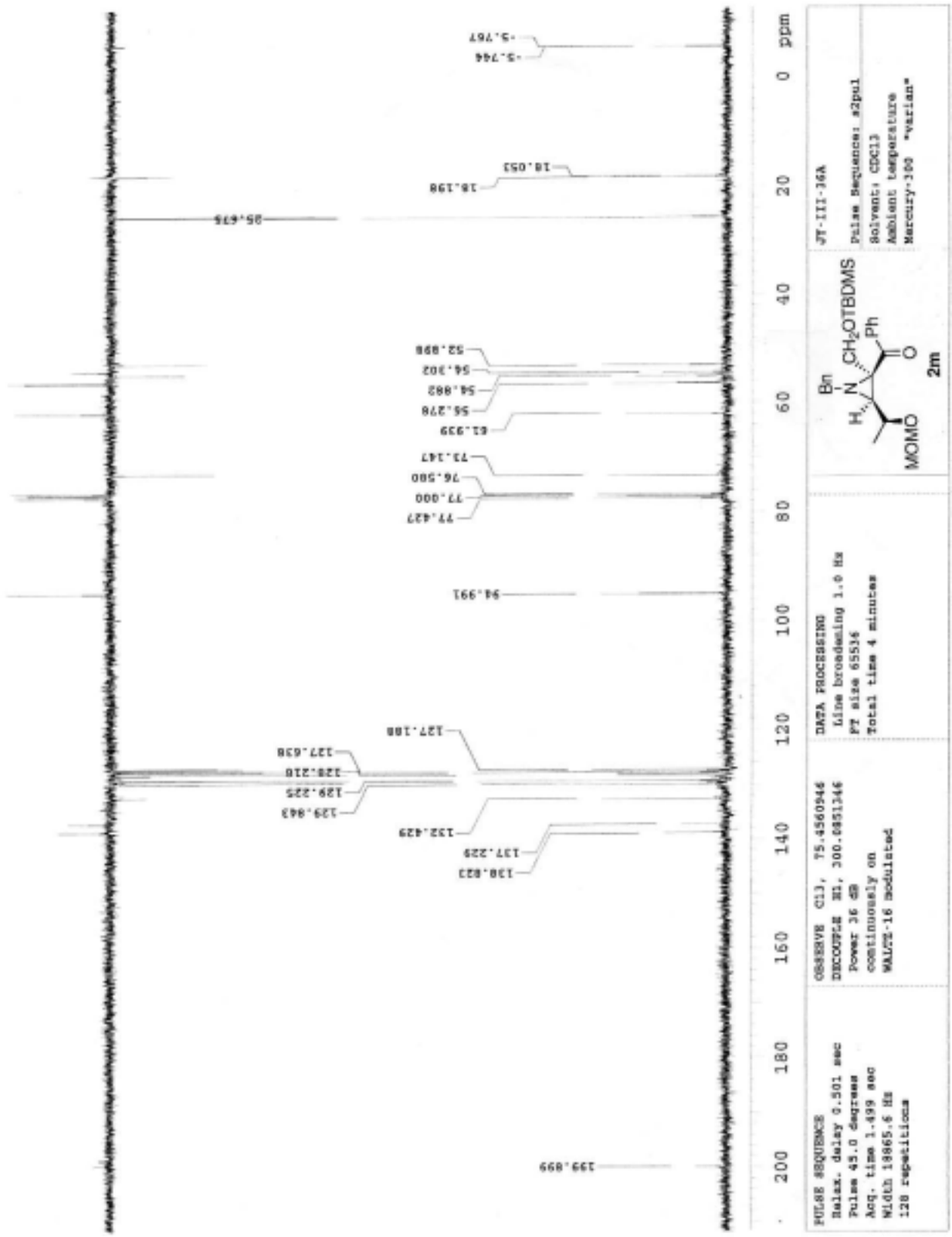

CT-III-198
Pulse Sequence: s2pul
Solvent: CDCl3
Ambient temperature
Mercury-300 "varian"
2k
Ph
O
Bu
N
H
Ph
H
PULSE SEQUENCE
Relax. delay 1.502 sec
Pulse 45.0 degrees
Acq. time 3.498 sec
Width 4500.5 Hz
28 repetitions
OBSERVE H1, 300.0816525
DATA PROCESSING
FT size 32768
Total time 2 minutes
ppm


13.697
22.044
22.799
25.057
40.378
48.320
52.455
69.912
76.573
77.000
77.420
127.020
127.241
127.460
127.714
127.974
128.454
135.428
143.477
208.062
ppm
20
40
60
80
100
120
140
160
180
200
128.0 ppm
127.020
127.241
127.460
127.714
127.974
128.454
JY-III-198
Pulse Sequence: s2pul
Solvent: CDCl3
Ambient temperature
Mercury-300 "varian"
2k
DATA PROCESSING
Line broadening 1.0 Hz
FT size 65536
Total time 6 minutes
PULSE SEQUENCE
Relax. delay 0.501 sec
Pulse 45.0 degrees
Acq. time 1.499 sec
Width 18865.6 Hz
192 repetitions
OBSERVE C13, 75.4560946
DECOUPLE H1, 300.0851346
Power 36 dB
continuously on
WALTZ-16 modulated


7.251
7.264
1378.69
1367.15
1336.66
1323.75
1181.18
1169.64
1063.88
1050.42
4.354
999.33
993.01
987.51
983.67
981.20
977.35
974.88
971.86
965.54
573.54
571.61
567.77
563.37
0.822
0.743
0.636
0.077
4.58 ppm
3.80 ppm
3.32 3.26 ppm
1.93 ppm
8
7
6
5
4
3
2
1
0
ppm
2.04
14.46
0.27
1.22
0.14
0.11
0.06
3.18
1.23
1.07
0.06
0.94
0.46
PULSE SEQUENCE
Relax. delay 1.502 sec
Pulse 45.0 degrees
Acq. time 3.498 sec
Width 4500.5 Hz
32 repetitions
OBSERVE H1, 300.0836520
DATA PROCESSING
FT size 32768
Total time 2 minutes
Bn
N
H
CH2OTBDMS
BnO
Ph
O
2l
SM-I-31
Pulse Sequence: s2pul
Solvent: CDCl3
Ambient temperature
Mercury-300 "varian"


-5.774
-5.744
18.053
25.614
25.691
27.255
27.560
47.900
55.721
56.049
61.748
69.633
72.552
73.720
76.580
77.000
77.427
127.005
127.112
127.371
127.554
127.753
128.233
128.260
128.287
128.447
128.607
129.004
129.813
132.429
137.374
138.556
139.343
200.234
0 ppm
20
40
60
80
100
120
140
160
180
200
JT-III-37A
Pulse dequence: s2pul
Solvent: CDCl3
Ambient temperature
Mercury-300 "varian"
Bn
N
CH2OTBDMS
Ph
O
H
BnO
21
DATA PROCESSING
Line broadening 1.0 Hz
FT size 65536
Total time 10 minutes
OBSERVE C13, 75.4540952
DECOUPLE H1, 300.0851346
Power 36 dB
continuously on
WALTZ-16 modulated
PULSE SEQUENCE
Relax. delay 0.501 sec
Pulse 45.0 degrees
Acq. time 1.499 sec
Width 18865.6 Hz
304 repetitions


JY-III-31A
Pulse Sequence: s2pul
Solvent: cdcl3
Ambient temperature
Mercury-300 "varian"
Bn
N
CH2OTBDMS
Ph
O
MOMO
2m
POLAR SEQUENCE
Relax. delay 1.502 sec
Pulse 45.0 degrees
Acq. time 3.499 sec
Width 4500.5 Hz
12 repetitions
OBSERVE H1, 300.0816523
DATA PROCESSING
FT size 32768
Total time 1 minute
ppm


-5.767
-5.744
18.053
18.198
35.675
52.898
54.302
54.882
56.278
61.939
73.147
76.580
77.000
77.427
94.991
127.188
127.638
128.210
129.225
129.843
132.429
137.229
138.823
199.899
0 ppm
20
40
60
80
100
120
140
160
180
200
PULSE SEQUENCE
Relax. delay 0.501 sec
Pulse 45.0 degrees
Acq. time 1.499 sec
Width 19865.6 Hz
128 repetitions
OBSERVE C13, 75.4560946
DECOUPLE H1, 300.0831346
Power 36 dB
continuously on
WALTZ-16 modulated
DATA PROCESSING
Line broadening 1.0 Hz
FT size 65536
Total time 4 minutes
JF-III-36A
Pulse Sequence: s2pul
Solvent: CDCl3
Ambient temperature
Mercury-300 "varian"
Bn
N
CH2OTBDMS
Ph
O
H
MOMO
2m