

## Copper(I)-Catalysed Stereoselective Debromoborylation of Aliphatic 1,1-Dibromo-1-Alkenes with Bis(pinacolato)diboron

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### 1. Instrumentation and Chemicals

Materials were obtained from commercial suppliers and purified by standard procedures unless otherwise noted. Solvents (Tetrahydrofuran, dehydrated –super–, 41001-05, Kanto Chemical Co., Inc.) for reactions were purchased from commercial suppliers, degassed via three freeze-pump-thaw cycles, and further dried over molecular sieves (MS 4Å). NMR spectra were recorded on JEOL JNM-ECX400P and JNM-ECS400 spectrometers (<sup>1</sup>H: 392 or 396 MHz, <sup>13</sup>C: 99 MHz and <sup>11</sup>B: 127 MHz). Tetramethylsilane (<sup>1</sup>H) CDCl<sub>3</sub> (<sup>13</sup>C) and BF<sub>3</sub>·OEt<sub>2</sub> (<sup>11</sup>B) were employed as external standards, respectively. Multiplicity was recorded as follows: s = singlet, brs = broad singlet, d = doublet, t = triplet, q = quartet, m = multiplet. CuCl (ReagentPlus® grade, 224332-25G, ≥99%) was purchased from Sigma-Aldrich Co., and used as received. Mesitylene was used as an internal standard to determine NMR yields. GLC analyses were conducted with a Shimadzu GC-2014 or GC-2025 equipped with ULBON HR-1 glass capillary column (Shinwa Chemical Industries) and a FID detector. High-resolution mass spectra were recorded at the Global Facility Center, Hokkaido

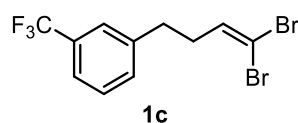
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## 2. Substrate Preparations

All 1,1-dibromo-1-alkenes were synthesized from corresponding aldehydes through Wittig reaction by using  $\text{PPh}_3$  and  $\text{CBr}_4$ .<sup>1</sup> If aldehydes were not commercially available materials, the aldehydes were synthesized from the corresponding alcohols by Swern oxidation.<sup>2</sup> The synthesized 1,1-dibromo-1-alkenes were subjected to purification by Kugelrohr distillation prior to use. The 1,1-dibromo-1-alkenes (**1c**, **1d**, **1k**, **1l**) were unknown compounds and the other 1,1-dibromo-1-alkenes (**1a**<sup>3a</sup>, **1b**<sup>3b</sup>, **1e**<sup>3c</sup>, **1f**<sup>3d</sup>, **1g**<sup>3e</sup>, **1h**<sup>3f</sup>, **1i**<sup>3g</sup>, **1j**<sup>3f</sup>, **1m**<sup>3h</sup>, **1n**<sup>3i</sup>) were known compounds.

## 3. Characterizations of 1,1-Dibromo-1-Alkenes Substrates

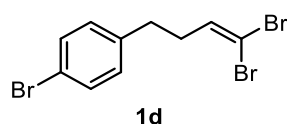
### 1-(4,4-Dibromobut-3-en-1-yl)-3-(trifluoromethyl)benzene (**1c**).



The product **1c** was obtained from corresponding alcohol in 98% yield (two steps, 1.72 g, 4.8 mmol) as a colorless oil.

$^1\text{H}$  NMR (392 MHz,  $\text{CDCl}_3$ ,  $\delta$ ): 2.43 (dd,  $J = 15.1, 7.6$  Hz, 2H), 2.79 (t,  $J = 7.6$  Hz, 2H), 6.40 (t,  $J = 7.4$  Hz, 1H), 7.34–7.51 (m, 4H).  $^{13}\text{C}$  NMR (99 MHz,  $\text{CDCl}_3$ ,  $\delta$ ): 33.6 ( $\text{CH}_2$ ), 34.3 ( $\text{CH}_2$ ), 90.2 (C), 123.2 (d,  $J_{\text{C-F}} = 3.8$  Hz, CH), 124.2 (d,  $J_{\text{C-F}} = 272.8$  Hz, C), 125.1 (d,  $J_{\text{C-F}} = 3.8$  Hz, CH), 129.0 (CH), 130.8 (q,  $J_{\text{C-F}} = 32.4$  Hz, C), 131.8 (CH), 136.8 (CH), 141.3 (C). HRMS-EI ( $m/z$ ):  $[\text{M}]^+$  calcd for  $\text{C}_{11}\text{H}_9\text{Br}_2\text{F}_3$ , 355.90231; found, 355.90137.

### 1-Bromo-4-(4,4-dibromobut-3-en-1-yl)benzene (**1d**).

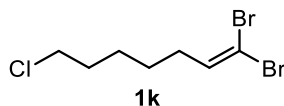


The product **1d** was obtained from corresponding alcohol in 99% yield (two steps, 3.42 g, 9.3 mmol) as a colorless oil.

$^1\text{H}$  NMR (392 MHz,  $\text{CDCl}_3$ ,  $\delta$ ): 2.39 (q,  $J = 7.7$  Hz, 2H), 2.69 (t,  $J = 7.6$  Hz, 2H), 6.38 (t,  $J = 7.3$

Hz, 1H), 7.06 (d,  $J = 7.8$  Hz, 2H), 7.38–7.47 (m, 2H).  $^{13}\text{C}$  NMR (99 MHz,  $\text{CDCl}_3$ ,  $\delta$ ): 33.2 ( $\text{CH}_2$ ), 34.4 ( $\text{CH}_2$ ), 89.9 (C), 120.0 (C), 130.1 (CH), 131.6 (CH), 137.1 (CH), 139.4 (C). HRMS-EI ( $m/z$ ):  $[\text{M}]^+$  calcd for  $\text{C}_{10}\text{H}_9\text{Br}_3$ , 365.82544; found, 365.82554.

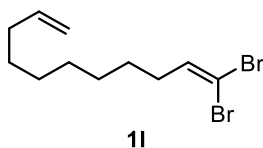
#### 1,1-Dibromo-7-chlorohept-1-ene (**1k**).



The product **1k** was obtained from corresponding alcohol in 65% yield (two steps, 2.35 g, 8.1 mmol) as a colorless oil.

$^1\text{H}$  NMR (392 MHz,  $\text{CDCl}_3$ ,  $\delta$ ): 1.41–1.53 (m, 4H), 1.74–1.84 (m, 2H), 2.07–2.17 (m, 2H), 3.54 (t,  $J = 6.5$  Hz, 2H), 6.39 (t,  $J = 6.9$  Hz, 1H).  $^{13}\text{C}$  NMR (99 MHz,  $\text{CDCl}_3$ ,  $\delta$ ): 26.3 ( $\text{CH}_2$ ), 27.1 ( $\text{CH}_2$ ), 32.3 ( $\text{CH}_2$ ), 32.8 ( $\text{CH}_2$ ), 44.8 ( $\text{CH}_2$ ), 89.0 (C), 138.3 (CH). HRMS-EI ( $m/z$ ):  $[\text{M}]^+$  calcd for  $\text{C}_7\text{H}_{11}\text{Br}_2\text{Cl}$ , 287.89160; found, 287.89205.

#### 1,1-Dibromoundeca-1,10-diene (**1l**).



The product **1l** was obtained from corresponding alcohol in 85% yield (two steps, 2.86 g, 9.2 mmol) as a colorless oil.

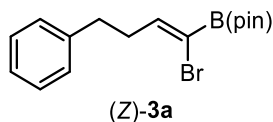
$^1\text{H}$  NMR (392 MHz,  $\text{CDCl}_3$ ,  $\delta$ ): 1.25–1.46 (m, 10H), 2.00–2.13 (m, 4H), 4.93 (ddt,  $J = 9.8, 2.4, 0.8$  Hz, 1H), 5.00 (dq,  $J = 17.6, 2.0$  Hz, 1H), 5.81 (ddt,  $J = 16.9, 13.3, 6.7$  Hz, 1H), 6.38 (t,  $J = 7.3$  Hz, 1H).  $^{13}\text{C}$  NMR (99 MHz,  $\text{CDCl}_3$ ,  $\delta$ ): 27.8 ( $\text{CH}_2$ ), 28.8 ( $\text{CH}_2$ ), 29.0 ( $\text{CH}_2$ ), 29.2 ( $\text{CH}_2$ ), 33.0 ( $\text{CH}_2$ ), 33.8 ( $\text{CH}_2$ ), 88.4 (C), 114.2 ( $\text{CH}_2$ ), 138.9 (CH), 139.1 (CH). HRMS-EI ( $m/z$ ):  $[\text{M}]^+$  calcd for  $\text{C}_{11}\text{H}_{18}\text{Br}_2$ , 307.97753; found, 307.97750.

#### 4. General Debromoborylation Procedures

Copper chloride (1.3 mg, 0.013 mmol), Xantphos (7.3 mg, 0.013 mmol), bis(pinacolato)diboron (76.2 mg, 0.30 mmol) were placed in an oven-dried reaction vial. And then, the vial was transferred to the glove box and NaOMe (27.0 mg, 0.50 mmol) was added to the vial under argon atmosphere. After the vial was sealed with a screw cap containing a Teflon-coated rubber septum, the vial was removed from the glove box and connected to a vacuum/nitrogen manifold through a needle. After dry THF (1 mL) was added to the reaction mixture, **1a** (69.1 mg, 0.24 mmol) was added dropwise to the reaction mixture at 30°C. After the reaction was complete, the mixture was passed through a short silica gel column eluting with Et<sub>2</sub>O. The crude material was purified by flash chromatography (SiO<sub>2</sub>, hexane/ethyl acetate, 20:1) to give the corresponding debromoborylation product (*Z*)-**3a** (46.1 mg, 0.14 mmol, 55%) as a slightly yellow oil.

#### 5. Characterizations of Debromoborylation Products

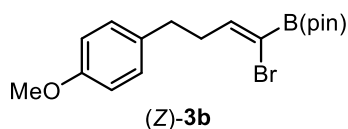
(*Z*)-2-(1-Bromo-4-phenylbut-1-en-1-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane [(*Z*)-**3a**].



The reaction was conducted with 69.1 mg (0.24 mmol) of **1a**. The product (*Z*)-**3a** was obtained in 55% yield (46.1 mg, 0.14 mmol) as a slightly yellow oil by flash chromatography (SiO<sub>2</sub>, hexane/ethyl acetate, 20:1).

<sup>1</sup>H NMR (392 MHz, CDCl<sub>3</sub>, δ): 1.30 (s, 12H), 2.58–2.66 (m, 2H), 2.77 (t, *J* = 7.8 Hz, 2H), 6.91 (t, *J* = 6.7 Hz, 1H), 7.17–7.24 (m, 3H), 7.27–7.33 (m, 2H). <sup>13</sup>C NMR (99 MHz, CDCl<sub>3</sub>, δ): 24.6 (CH<sub>3</sub>), 33.7 (CH<sub>2</sub>), 34.0 (CH<sub>2</sub>), 84.6 (C), 126.0 (CH), 128.2 (CH), 128.3 (CH), 141.0 (C), 148.0 (CH). The carbon directly attached to the boron atom was not detected, likely due to quadrupolar relaxation.<sup>4,5</sup> <sup>11</sup>B NMR (127 MHz, CDCl<sub>3</sub>, δ): 28.0. HRMS-EI (*m/z*): [M]<sup>+</sup> calcd for C<sub>16</sub>H<sub>22</sub>BBrO<sub>2</sub>, 335.09325; found, 335.09292.

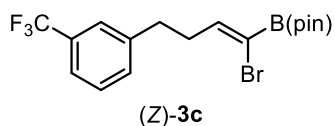
**(Z)-2-[1-Bromo-4-(4-methoxyphenyl)but-1-en-1-yl]-4,4,5,5-tetramethyl-1,3,2-dioxaborolane [(Z)-3b].**



The reaction was conducted with 80.0 mg (0.25 mmol) of **1b**. The product **(Z)-3b** was obtained in 52% yield (47.2 mg, 0.13 mmol) as a colorless oil by flash chromatography (SiO<sub>2</sub>, hexane/ethyl acetate, 20:1).

<sup>1</sup>H NMR (392 MHz, CDCl<sub>3</sub>, δ): 1.29 (s, 12H), 2.54–2.63 (m, 2H), 2.71 (dd, *J* = 9.4, 6.3 Hz, 2H), 3.79 (s, 3H), 6.84 (dd, *J* = 6.7, 2.0 Hz, 2H), 6.90 (t, *J* = 6.5 Hz, 1H), 7.13 (dt, *J* = 9.3, 2.6 Hz, 2H). <sup>13</sup>C NMR (99 MHz, CDCl<sub>3</sub>, δ): 24.7 (CH<sub>3</sub>), 32.8 (CH<sub>2</sub>), 34.4 (CH<sub>2</sub>), 55.2 (CH<sub>3</sub>), 84.6 (C), 113.8 (CH), 129.2 (CH), 133.2 (C), 148.2 (CH), 157.9 (C). The carbon directly attached to the boron atom was not detected, likely due to quadrupolar relaxation.<sup>4,5</sup> <sup>11</sup>B NMR (127 MHz, CDCl<sub>3</sub>, δ): 27.9. HRMS-EI (*m/z*): [M]<sup>+</sup> calcd for C<sub>17</sub>H<sub>24</sub>BBrO<sub>3</sub>, 365.10382; found, 365.10351.

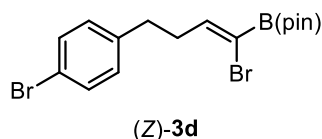
**(Z)-2-{1-Bromo-4-[3-(trifluoromethyl)phenyl]but-1-en-1-yl}-4,4,5,5-tetramethyl-1,3,2-dioxaborolane [(Z)-3c].**



The reaction was conducted with 85.0 mg (0.24 mmol) of **1c**. The product **(Z)-3c** was obtained in 58% yield (55.3 mg, 0.14 mmol) as a colorless oil by flash chromatography (SiO<sub>2</sub>, hexane/ethyl acetate, 25:1).

<sup>1</sup>H NMR (392 MHz, CDCl<sub>3</sub>, δ): 1.30 (s, 12H), 2.59–2.67 (m, 2H), 2.83 (dd, *J* = 9.0, 6.7 Hz, 2H), 6.87 (t, *J* = 6.7 Hz, 1H), 7.38–7.49 (m, 4H). <sup>13</sup>C NMR (99 MHz, CDCl<sub>3</sub>, δ): 24.6 (CH<sub>3</sub>), 33.5 (CH<sub>2</sub>), 33.7 (CH<sub>2</sub>), 84.8 (C), 123.0 (d, *J*<sub>C-F</sub> = 3.8 Hz, CH), 124.2 (d, *J*<sub>C-F</sub> = 273.8 Hz, C), 125.1 (d, *J*<sub>C-F</sub> = 3.8 Hz, CH), 128.8 (CH), 130.6 (d, *J*<sub>C-F</sub> = 32.1 Hz, C), 131.7 (CH), 141.9 (C), 147.1 (CH). The carbon directly attached to the boron atom was not detected, likely due to quadrupolar relaxation.<sup>4,5</sup> <sup>11</sup>B NMR (127 MHz, CDCl<sub>3</sub>, δ): 28.0. HRMS-EI (*m/z*): [M]<sup>+</sup> calcd for C<sub>17</sub>H<sub>21</sub>BBrF<sub>3</sub>O<sub>2</sub>, 403.08064; found, 403.07908.

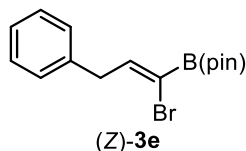
**(Z)-2-[1-Bromo-4-(4-bromophenyl)but-1-en-1-yl]-4,4,5,5-tetramethyl-1,3,2-dioxaborolane [(Z)-3d].**



The reaction was conducted with 88.5 mg (0.24 mmol) of **1d**. The product **(Z)-3d** was obtained in 62% yield (61.3 mg, 0.15 mmol) as a white solid (m.p. = 64–65°C) by flash chromatography (SiO<sub>2</sub>, hexane/ethyl acetate, 20:1).

<sup>1</sup>H NMR (392 MHz, CDCl<sub>3</sub>, δ): 1.30 (s, 12H), 2.55–2.63 (m, 2H), 2.68–2.76 (m, 2H), 6.86 (t, *J* = 6.9 Hz, 1H), 7.09 (d, *J* = 8.2 Hz, 2H), 7.38–7.43 (m, 2H). <sup>13</sup>C NMR (99 MHz, CDCl<sub>3</sub>, δ): 24.7 (CH<sub>3</sub>), 33.1 (CH<sub>2</sub>), 33.8 (CH<sub>2</sub>), 84.8 (C), 119.8 (C), 130.1 (CH), 131.4 (CH), 140.0 (C), 147.5 (CH). The carbon directly attached to the boron atom was not detected, likely due to quadrupolar relaxation.<sup>4,5</sup> <sup>11</sup>B NMR (127 MHz, CDCl<sub>3</sub>, δ): 27.9. HRMS-EI (*m/z*): [M]<sup>+</sup> calcd for C<sub>16</sub>H<sub>21</sub>BBr<sub>2</sub>O<sub>2</sub>, 413.00377; found, 413.00367.

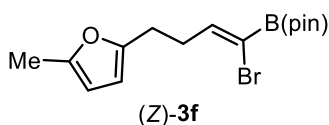
**(Z)-2-(1-Bromo-3-phenylprop-1-en-1-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane [(Z)-3e].**



The reaction was conducted with 70.5 mg (0.26 mmol) of **1e**. The product **(Z)-3e** was obtained in 55% yield (44.6 mg, 0.14 mmol) as a yellow oil by flash chromatography (SiO<sub>2</sub>, hexane/ethyl acetate, 25:1).

<sup>1</sup>H NMR (396 MHz, CDCl<sub>3</sub>, δ): 1.29 (s, 12H), 3.66 (d, *J* = 6.7 Hz, 2H), 6.99 (t, *J* = 6.9 Hz, 1H), 7.20–7.25 (m, 3H), 7.27–7.33 (m, 2H). <sup>13</sup>C NMR (99 MHz, CDCl<sub>3</sub>, δ): 24.6 (CH<sub>3</sub>), 38.7 (CH<sub>2</sub>), 84.7 (C), 126.4 (CH), 128.5 (CH), 128.6 (CH), 138.2 (C), 147.3 (CH). The carbon directly attached to the boron atom was not detected, likely due to quadrupolar relaxation.<sup>4,5</sup> <sup>11</sup>B NMR (127 MHz, CDCl<sub>3</sub>, δ): 28.1. HRMS-EI (*m/z*): [M]<sup>+</sup> calcd for C<sub>15</sub>H<sub>20</sub>BBrO<sub>2</sub>, 321.07760; found, 321.07687.

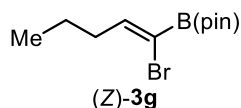
**(Z)-2-[1-Bromo-4-(5-methylfuran-2-yl)but-1-en-1-yl]-4,4,5,5-tetramethyl-1,3,2-dioxaborolane [(Z)-3f].**



The reaction was conducted with 75.8 mg (0.26 mmol) of **1f**. The product (**Z**)-**3f** was obtained in 62% yield (55.0 mg, 0.16 mmol) as a slightly yellow oil by flash chromatography (SiO<sub>2</sub>, hexane/ethyl acetate, 25:1).

<sup>1</sup>H NMR (396 MHz, CDCl<sub>3</sub>, δ): 1.30 (s, 12H), 2.25 (s, 3H), 2.59–2.66 (m, 2H), 2.74 (t, *J* = 7.6 Hz, 2H), 5.85 (dd, *J* = 2.9, 1.0 Hz, 1H), 5.90 (d, *J* = 2.7 Hz, 1H), 6.88 (t, *J* = 6.3 Hz, 1H). <sup>13</sup>C NMR (99 MHz, CDCl<sub>3</sub>, δ): 13.5 (CH<sub>3</sub>), 24.7 (CH<sub>3</sub>), 26.1 (CH<sub>2</sub>), 30.9 (CH<sub>2</sub>), 84.7 (C), 105.7 (CH), 105.8 (CH), 147.8 (CH), 150.5 (C), 152.9 (C). The carbon directly attached to the boron atom was not detected, likely due to quadrupolar relaxation.<sup>4,5</sup> <sup>11</sup>B NMR (127 MHz, CDCl<sub>3</sub>, δ): 27.9. HRMS-EI (*m/z*): [M]<sup>+</sup> calcd for C<sub>15</sub>H<sub>22</sub>BBrO<sub>3</sub>, 339.08817; found, 339.08676.

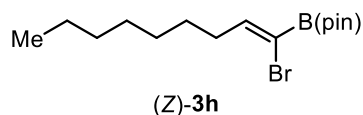
**(Z)-2-(1-Bromopent-1-en-1-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane [(Z)-3g].**



The reaction was conducted with 56.6 mg (0.25 mmol) of **1g**. The product (**Z**)-**3g** was obtained in 59% yield (40.0 mg, 0.15 mmol) as a slightly yellow oil by flash chromatography (SiO<sub>2</sub>, hexane/ethyl acetate, 25:1).

<sup>1</sup>H NMR (392 MHz, CDCl<sub>3</sub>, δ): 0.96 (t, *J* = 7.4 Hz, 3H), 1.30 (s, 12H), 1.49 (sxt, *J* = 7.4 Hz, 2H), 2.28 (dd, *J* = 14.5, 7.4 Hz, 2H), 6.85 (t, *J* = 6.7 Hz, 1H). <sup>13</sup>C NMR (99 MHz, CDCl<sub>3</sub>, δ): 13.9 (CH<sub>3</sub>), 21.0 (CH<sub>2</sub>), 24.7 (CH<sub>3</sub>), 34.4 (CH<sub>2</sub>), 84.6 (C), 149.3 (CH). The carbon directly attached to the boron atom was not detected, likely due to quadrupolar relaxation.<sup>4,5</sup> <sup>11</sup>B NMR (127 MHz, CDCl<sub>3</sub>, δ): 28.0. HRMS-EI (*m/z*): [M]<sup>+</sup> calcd for C<sub>11</sub>H<sub>20</sub>BBrO<sub>2</sub>, 273.07760; found, 273.07773.

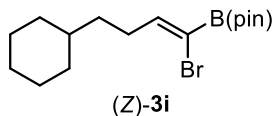
**(Z)-2-(1-Bromonon-1-en-1-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane [(Z)-3h].**



The reaction was conducted with 68.5 mg (0.24 mmol) of **1h**. The product (Z)-**3h** was obtained in 62% yield (49.1 mg, 0.15 mmol) as a slightly yellow oil by flash chromatography (SiO<sub>2</sub>, hexane/ethyl acetate, 25:1).

<sup>1</sup>H NMR (392 MHz, CDCl<sub>3</sub>, δ): 0.88 (t, *J* = 6.9 Hz, 3H), 1.24–1.35 (m, 20H), 1.40–1.50 (m, 2H), 2.30 (q, *J* = 7.1 Hz, 2H), 6.84 (t, *J* = 6.9 Hz, 1H). <sup>13</sup>C NMR (99 MHz, CDCl<sub>3</sub>, δ): 14.0 (CH<sub>3</sub>), 22.6 (CH<sub>2</sub>), 24.7 (CH<sub>3</sub>), 27.7 (CH<sub>2</sub>), 29.0 (CH<sub>2</sub>), 29.2 (CH<sub>2</sub>), 31.7 (CH<sub>2</sub>), 32.4 (CH<sub>2</sub>), 84.5 (C), 149.5 (CH). The carbon directly attached to the boron atom was not detected, likely due to quadrupolar relaxation.<sup>4,5</sup> <sup>11</sup>B NMR (127 MHz, CDCl<sub>3</sub>, δ): 28.0. HRMS-EI (*m/z*): [M]<sup>+</sup> calcd for C<sub>15</sub>H<sub>28</sub>BBrO<sub>2</sub>, 329.14020; found, 329.14013.

**(Z)-2-(1-Bromo-4-cyclohexylbut-1-en-1-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane [(Z)-3i].**

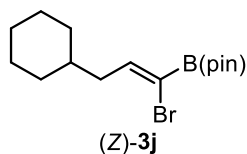


The reaction was conducted with 75.5 mg (0.26 mmol) of **1i**. The product (Z)-**3i** was obtained in 57% yield (49.6 mg, 0.14 mmol) as a slightly yellow oil by flash chromatography (SiO<sub>2</sub>, hexane/ethyl acetate, 25:1).

<sup>1</sup>H NMR (392 MHz, CDCl<sub>3</sub>, δ): 0.82–0.95 (m, 2H), 1.17–1.37 (m, 18H), 1.60–1.78 (m, 5H), 2.30 (dd, *J* = 15.9, 6.9 Hz, 2H), 6.83 (t, *J* = 6.7 Hz, 1H). <sup>13</sup>C NMR (99 MHz, CDCl<sub>3</sub>, δ): 24.7 (CH<sub>3</sub>), 26.2 (CH<sub>2</sub>), 26.6 (CH<sub>2</sub>), 29.9 (CH<sub>2</sub>), 33.1 (CH<sub>2</sub>), 35.2 (CH<sub>2</sub>), 37.2 (CH), 84.6 (C), 149.8 (CH). The carbon directly attached to the boron atom was not detected, likely due to quadrupolar relaxation.<sup>4,5</sup> <sup>11</sup>B NMR (127 MHz, CDCl<sub>3</sub>, δ): 28.0. HRMS-EI (*m/z*): [M]<sup>+</sup> calcd for C<sub>16</sub>H<sub>28</sub>BBrO<sub>2</sub>, 341.14020; found, 341.14006.



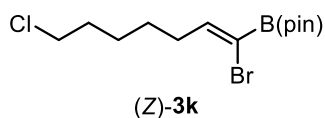
**(Z)-2-(1-Bromo-3-cyclohexylprop-1-en-1-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane [(Z)-3j].**



The reaction was conducted with 69.5 mg (0.25 mmol) of **1j**. The product **(Z)-3j** was obtained in 58% yield (46.6 mg, 0.14 mmol) as a pink oil by flash chromatography (SiO<sub>2</sub>, hexane/ethyl acetate, 25:1).

<sup>1</sup>H NMR (392 MHz, CDCl<sub>3</sub>, δ): 0.92–1.04 (m, 2H), 1.12–1.25 (m, 3H), 1.30 (s, 12H), 1.40–1.52 (m, 1H), 1.58–1.78 (m, 5H), 2.20 (t, *J* = 7.1 Hz, 2H), 6.86 (t, *J* = 6.9 Hz, 1H). <sup>13</sup>C NMR (99 MHz, CDCl<sub>3</sub>, δ): 24.7 (CH<sub>3</sub>), 26.2 (CH<sub>2</sub>), 26.3 (CH<sub>2</sub>), 33.1 (CH<sub>2</sub>), 37.1 (CH), 40.0 (CH<sub>2</sub>), 84.6 (C), 148.3 (CH). The carbon directly attached to the boron atom was not detected, likely due to quadrupolar relaxation.<sup>4,5</sup> <sup>11</sup>B NMR (127 MHz, CDCl<sub>3</sub>, δ): 28.0. HRMS-EI (*m/z*): [M]<sup>+</sup> calcd for C<sub>15</sub>H<sub>26</sub>BBro<sub>2</sub>, 327.12455; found, 327.12477.

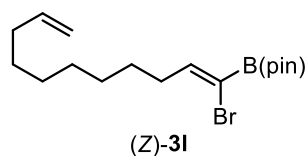
**(Z)-2-(1-Bromo-7-chlorohept-1-en-1-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane [(Z)-3k].**



The reaction was conducted with 70.0 mg (0.24 mmol) of **1k**. The product **(Z)-3k** was obtained in 57% yield (46.4 mg, 0.14 mmol) as a slightly yellow oil by flash chromatography (SiO<sub>2</sub>, hexane/ethyl acetate, 25:1).

<sup>1</sup>H NMR (396 MHz, CDCl<sub>3</sub>, δ): 1.30 (s, 12H), 1.45–1.52 (m, 4H), 1.75–1.85 (m, 2H), 2.29–2.36 (m, 2H), 3.54 (t, *J* = 6.7 Hz, 2H), 6.83 (t, *J* = 6.9 Hz, 1H). <sup>13</sup>C NMR (99 MHz, CDCl<sub>3</sub>, δ): 24.7 (CH<sub>3</sub>), 26.5 (CH<sub>2</sub>), 26.9 (CH<sub>2</sub>), 32.1 (CH<sub>2</sub>), 32.3 (CH<sub>2</sub>), 44.9 (CH<sub>2</sub>), 84.6 (C), 148.7 (CH). The carbon directly attached to the boron atom was not detected, likely due to quadrupolar relaxation.<sup>4,5</sup> <sup>11</sup>B NMR (127 MHz, CDCl<sub>3</sub>, δ): 28.0. HRMS-EI (*m/z*): [M]<sup>+</sup> calcd for C<sub>13</sub>H<sub>23</sub>BBrClO<sub>2</sub>, 335.06993; found, 335.07008.

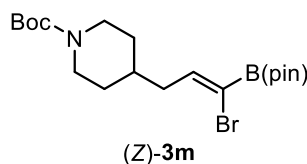
**(Z)-2-(1-Bromoundeca-1,10-dien-1-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane [(Z)-3I].**



The reaction was conducted with 79.8 mg (0.26 mmol) of **1I**. The product **(Z)-3I** was obtained in 54% yield (49.1 mg, 0.14 mmol) as a salmon pink oil by flash chromatography (SiO<sub>2</sub>, hexane/ethyl acetate, 25:1).

<sup>1</sup>H NMR (392 MHz, CDCl<sub>3</sub>, δ): 1.28–1.49 (m, 22H), 2.04 (dd, *J* = 13.7, 7.1 Hz, 2H), 2.30 (q, *J* = 7.2 Hz, 2H), 4.91–4.96 (m, 1H), 4.96–5.03 (m, 1H), 5.81 (ddt, *J* = 17.2, 13.7, 6.7 Hz, 1H), 6.84 (t, *J* = 6.7 Hz, 1H). <sup>13</sup>C NMR (99 MHz, CDCl<sub>3</sub>, δ): 24.7 (CH<sub>3</sub>), 27.7 (CH<sub>2</sub>), 28.8 (CH<sub>2</sub>), 29.0 (CH<sub>2</sub>), 29.2 (CH<sub>2</sub>), 32.4 (CH<sub>2</sub>), 33.8 (CH<sub>2</sub>), 84.6 (C), 114.1 (CH<sub>2</sub>), 139.1 (CH), 149.5 (CH). The carbon directly attached to the boron atom was not detected, likely due to quadrupolar relaxation.<sup>4,5</sup> <sup>11</sup>B NMR (127 MHz, CDCl<sub>3</sub>, δ): 28.0. HRMS-EI (*m/z*): [M]<sup>+</sup> calcd for C<sub>17</sub>H<sub>30</sub>BBrO<sub>2</sub>, 355.15585; found, 355.15485.

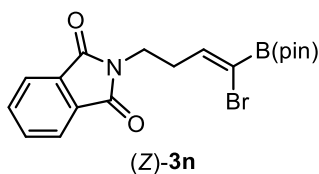
**Tert-butyl-(Z)-4-[3-bromo-3-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)allyl]piperidine-1-carboxylate [(Z)-3m].**



The reaction was conducted with 95.0 mg (0.25 mmol) of **1m**. The product **(Z)-3m** was obtained in 51% yield (54.0 mg, 0.13 mmol) as a white solid (m.p. = 82–83°C) by flash chromatography (SiO<sub>2</sub>, hexane/ethyl acetate, 10:1).

<sup>1</sup>H NMR (392 MHz, CDCl<sub>3</sub>, δ): 1.12–1.25 (m, 2H), 1.30 (s, 12H), 1.45 (s, 9H), 1.56–1.73 (m, 3H), 2.28 (t, *J* = 6.9 Hz, 2H), 2.58–2.78 (m, 2H), 4.08 (brs, 2H), 6.85 (t, *J* = 6.9 Hz, 1H). <sup>13</sup>C NMR (99 MHz, CDCl<sub>3</sub>, δ): 24.6 (CH<sub>3</sub>), 28.4 (CH<sub>3</sub>), 31.8 (CH<sub>2</sub>), 35.3 (CH), 38.9 (CH<sub>2</sub>), 43.4 (CH<sub>2</sub>), 44.1 (CH<sub>2</sub>), 79.2 (C), 84.6 (C), 146.7 (CH), 154.7 (C). The carbon directly attached to the boron atom was not detected, likely due to quadrupolar relaxation.<sup>4,5</sup> <sup>11</sup>B NMR (127 MHz, CDCl<sub>3</sub>, δ): 28.0. HRMS-EI (*m/z*): [M]<sup>+</sup> calcd for C<sub>19</sub>H<sub>33</sub>BBrNO<sub>4</sub>, 428.17223; found, 427.17182.

**(Z)-2-[4-Bromo-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)but-3-en-1-yl]isoindoline-1,3-dione [(Z)-3n].**



The reaction was conducted with 92.0 mg (0.26 mmol) of **1n**. The product (Z)-**3n** was obtained in 50% yield (51.1 mg, 0.13 mmol) as a white solid (m.p. = 126–127°C) by flash chromatography (SiO<sub>2</sub>, hexane/ethyl acetate, 10:1).

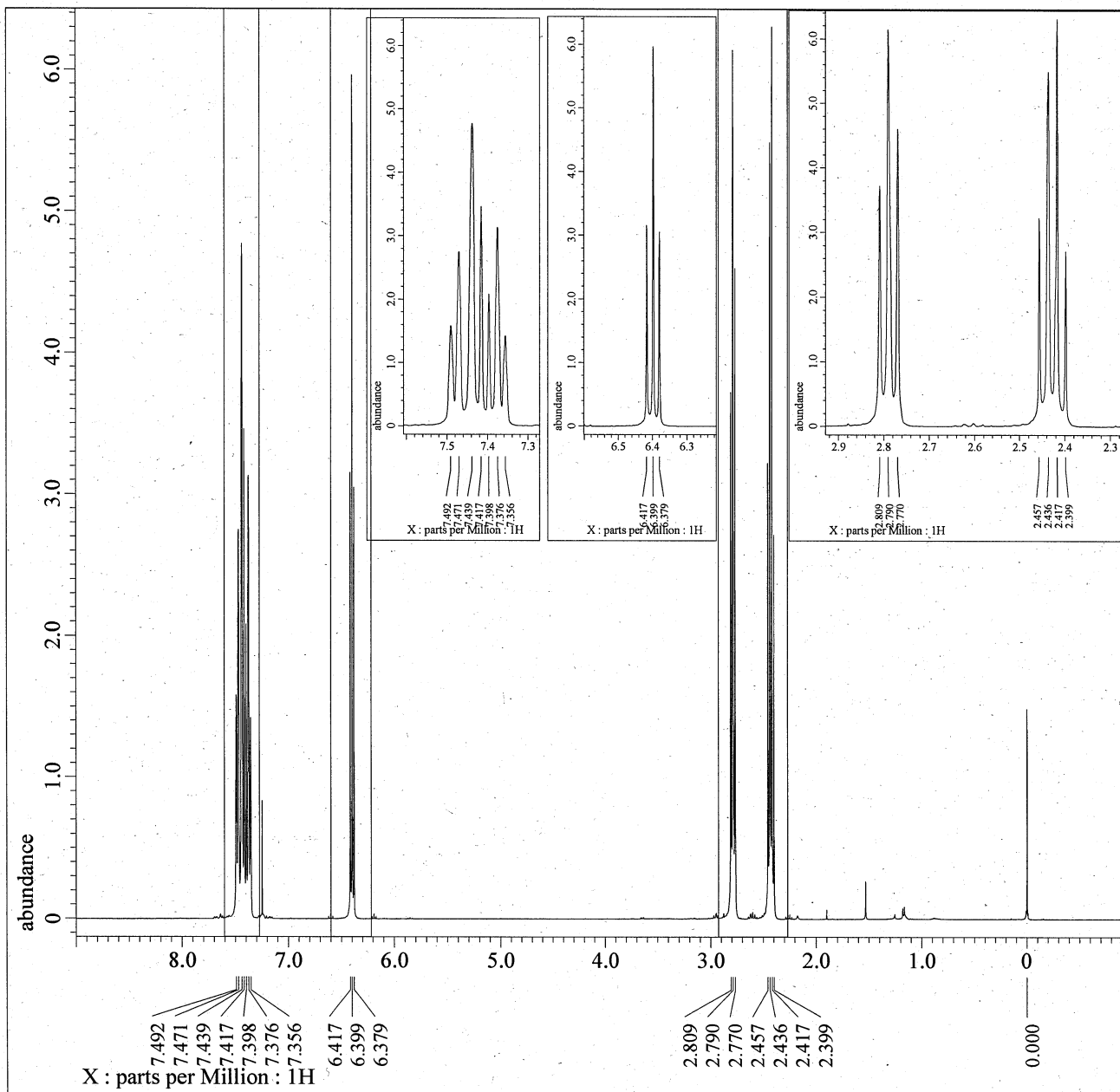
<sup>1</sup>H NMR (392 MHz, CDCl<sub>3</sub>, δ): 1.29 (s, 12H), 2.71 (dd, *J* = 14.3, 7.3 Hz, 2H), 3.84 (t, *J* = 7.1 Hz, 2H), 6.88 (t, *J* = 6.7 Hz, 1H), 7.69–7.75 (m, 2H), 7.81–7.88 (m, 2H). <sup>13</sup>C NMR (99 MHz, CDCl<sub>3</sub>, δ): 24.6 (CH<sub>3</sub>), 31.6 (CH<sub>2</sub>), 35.7 (CH<sub>2</sub>), 84.7 (C), 123.2 (CH), 132.0 (C), 133.9 (CH), 144.2 (CH), 168.1 (C). The carbon directly attached to the boron atom was not detected, likely due to quadrupolar relaxation.<sup>4,5</sup> <sup>11</sup>B NMR (127 MHz, CDCl<sub>3</sub>, δ): 27.9. HRMS-EI (*m/z*): [M]<sup>+</sup> calcd for C<sub>18</sub>H<sub>21</sub>BBrNO<sub>4</sub>, 404.07833; found, 404.07791.

## 6. Information on Single Crystal X-ray Diffraction Analysis

CCDC 1835168 contains the supplementary crystallographic data for compound (Z)-**3n**. These data can be obtained free of charge from The Cambridge Crystallographic Data Centre via [www.ccdc.cam.ac.uk/data\\_request/cif](http://www.ccdc.cam.ac.uk/data_request/cif).

## 7. References

1. N. B. Desai, N. McKelvie and F. Ramirez, *J. Am. Chem. Soc.*, 1962, **84**, 1745.
2. K. Omura, A. K. Sharma and D. Swern, *J. Org. Chem.*, 1976, **41**, 957.
3. [a] J. Zhang, C. Cheng, D. Wang and Z. Miao, *J. Org. Chem.*, 2017, **82**, 10121; [b] X. Ma and S. B. Herzon, *J. Org. Chem.*, 2016, **81**, 8673; [c] G. Evano, K. Tadiparthi and F. Couty, *Chem. Commun.*, 2011, **47**, 179; [d] Y. Chen, B. Shuai, C. Ma, X. Zhang, P. Fang and T. Mei, *Org. Lett.*, 2017, **19**, 2969; [e] V. Dwivedi, M. H. Babu, R. Kant and M. S. Reddy, *Chem. Commun.*, 2015, **51**, 14996; [f] Y. Li, L. Cheng, Y. Shao, S. Jiang, J. Cai and N. Qing, *Eur. J. Org. Chem.*, 2015, 4325; [g] Y. Oonishi, M. Mori and Y. Sato, *Synthesis*, 2007, 2323; [h] T. Sato, K. Okamoto, Y. Nakano, J. Uenishi and M. Ikeda, *Heterocycles*, 2001, **54**, 747; [i] B. K. Anderson and T. Livinghouse, *J. Org. Chem.*, 2015, **80**, 9847.
4. B. Wrackmeyer, *Prog. Nucl. Magn. Reson. Spectrosc.*, 1979, **12**, 227.
5. N. F. Pelz, A. R. Woodward, H. E. Burks, J. D. Sieber and J. P. Morken, *J. Am. Chem. Soc.*, 2004, **126**, 16328.



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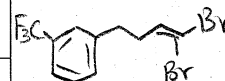
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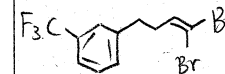
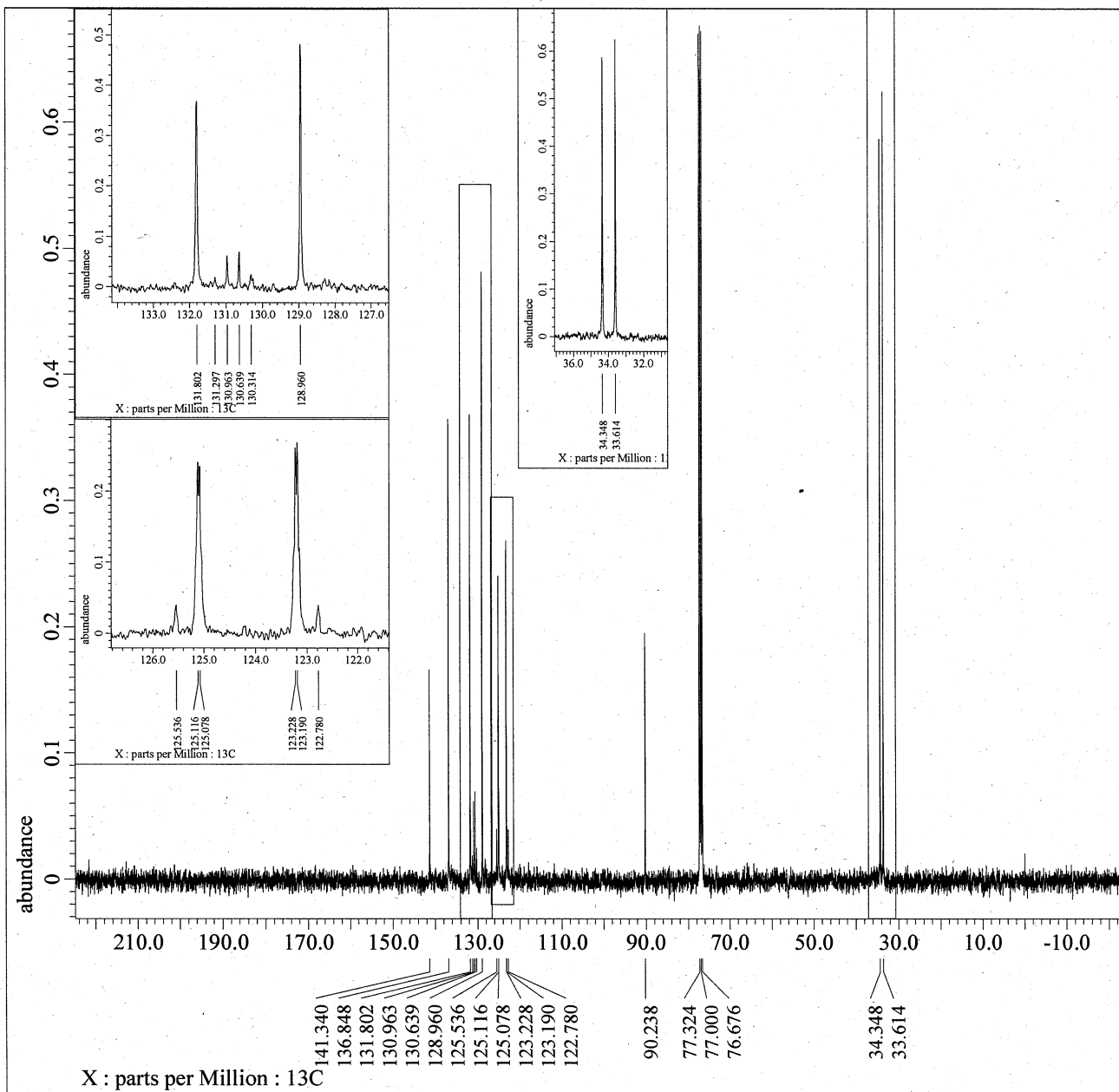
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1c



1C

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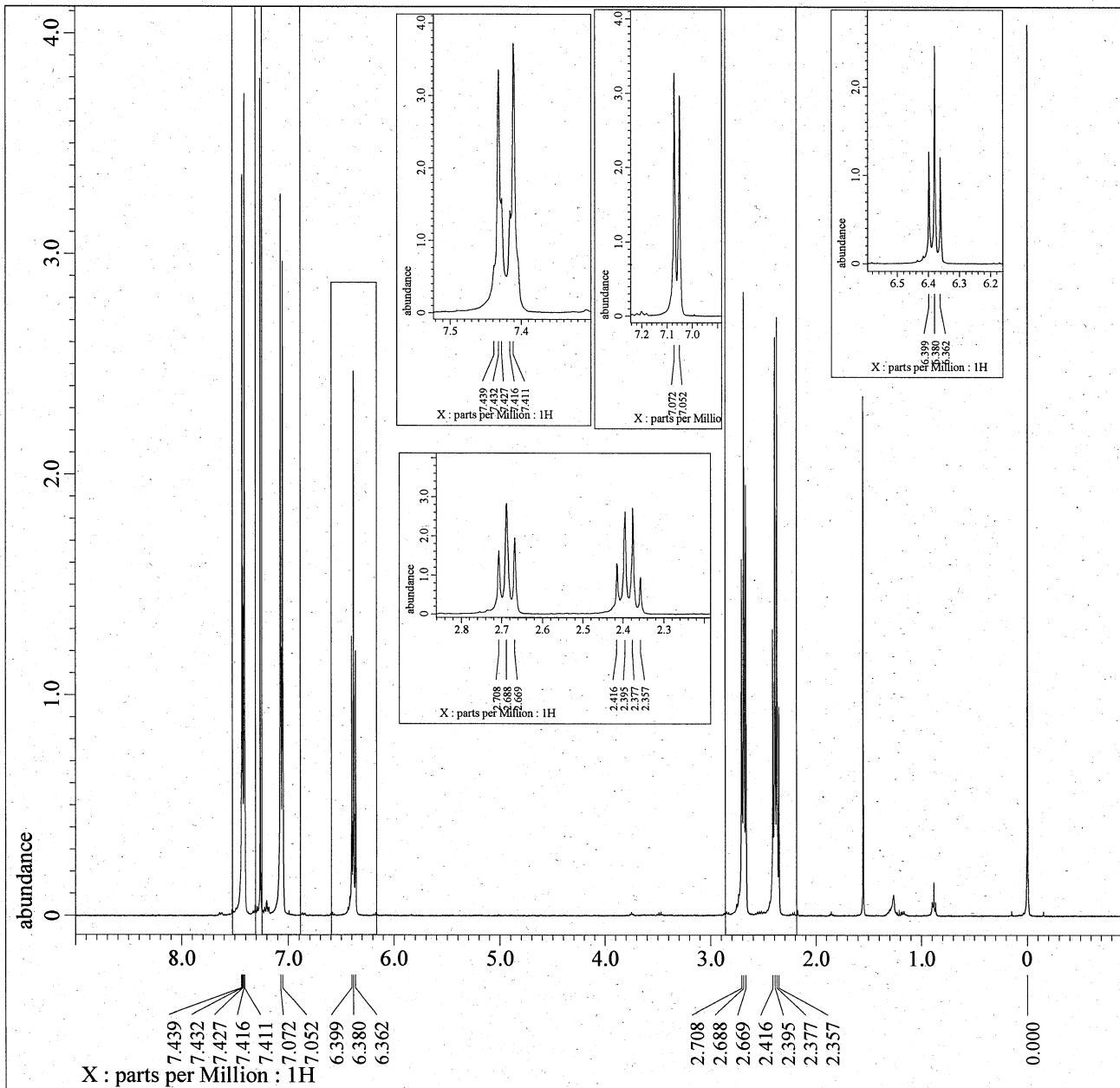
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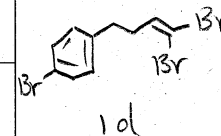
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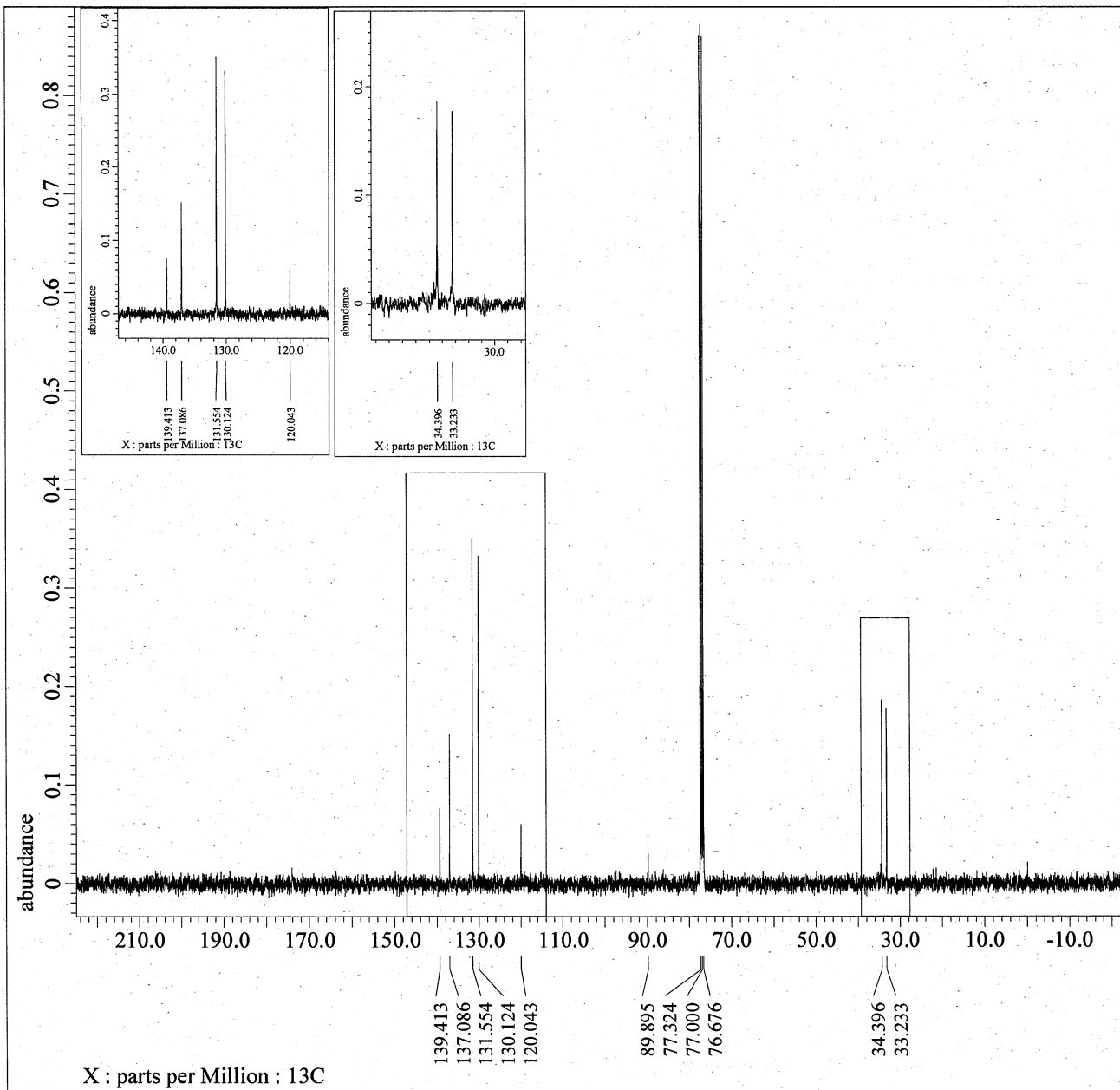
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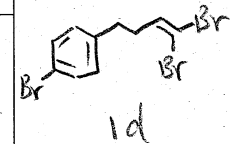
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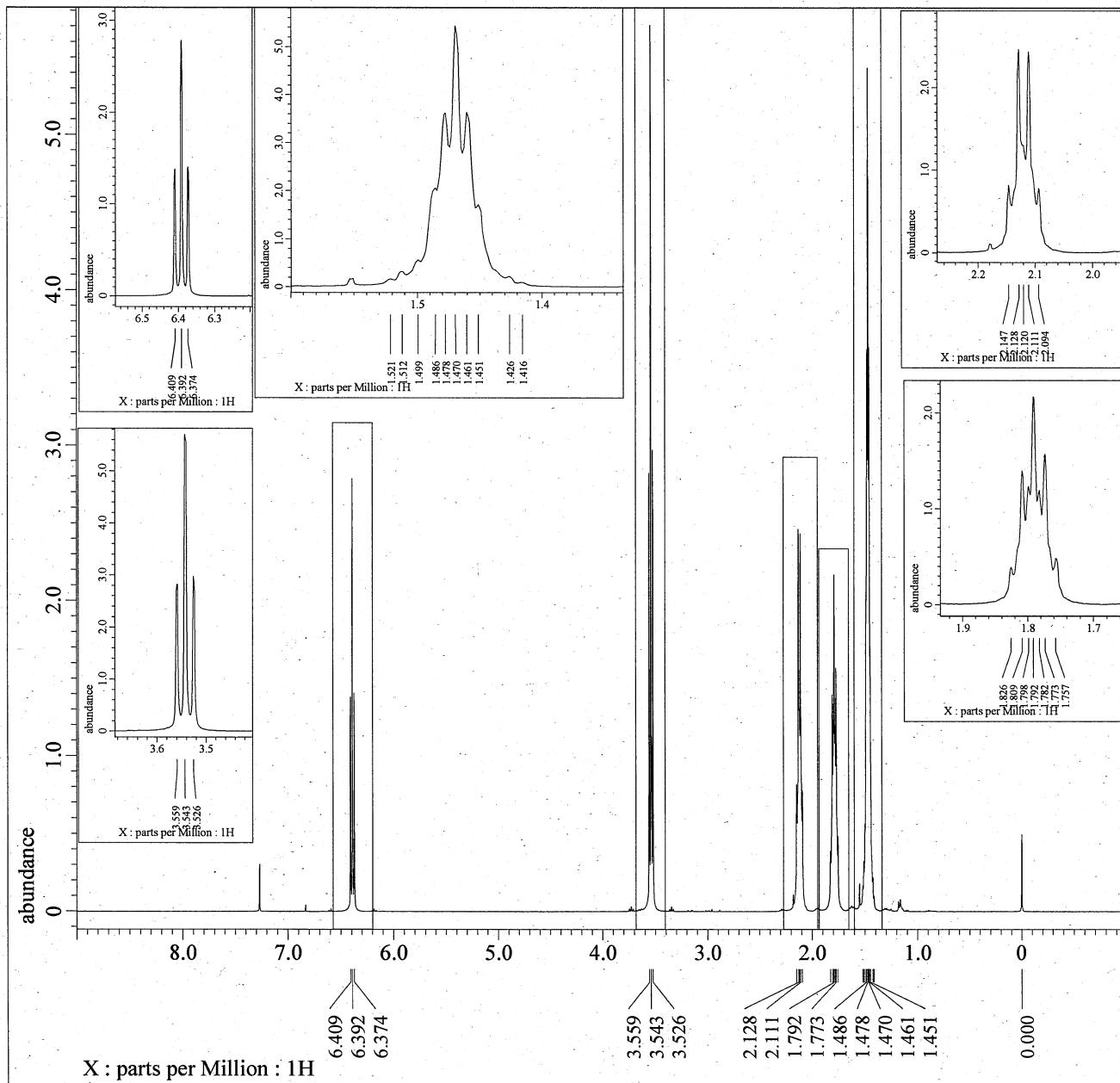
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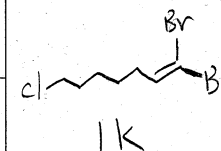
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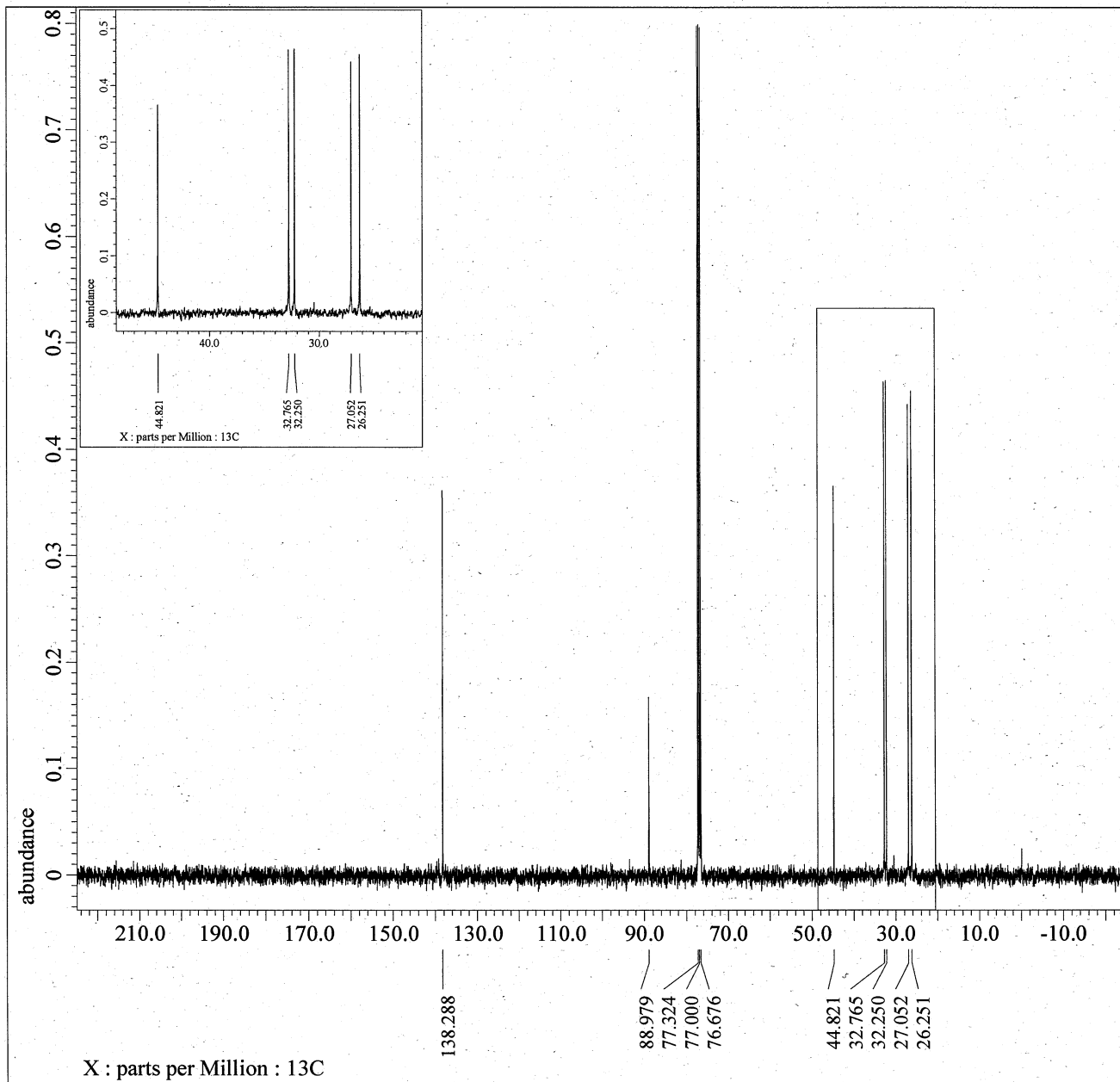
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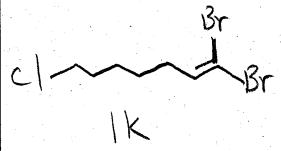


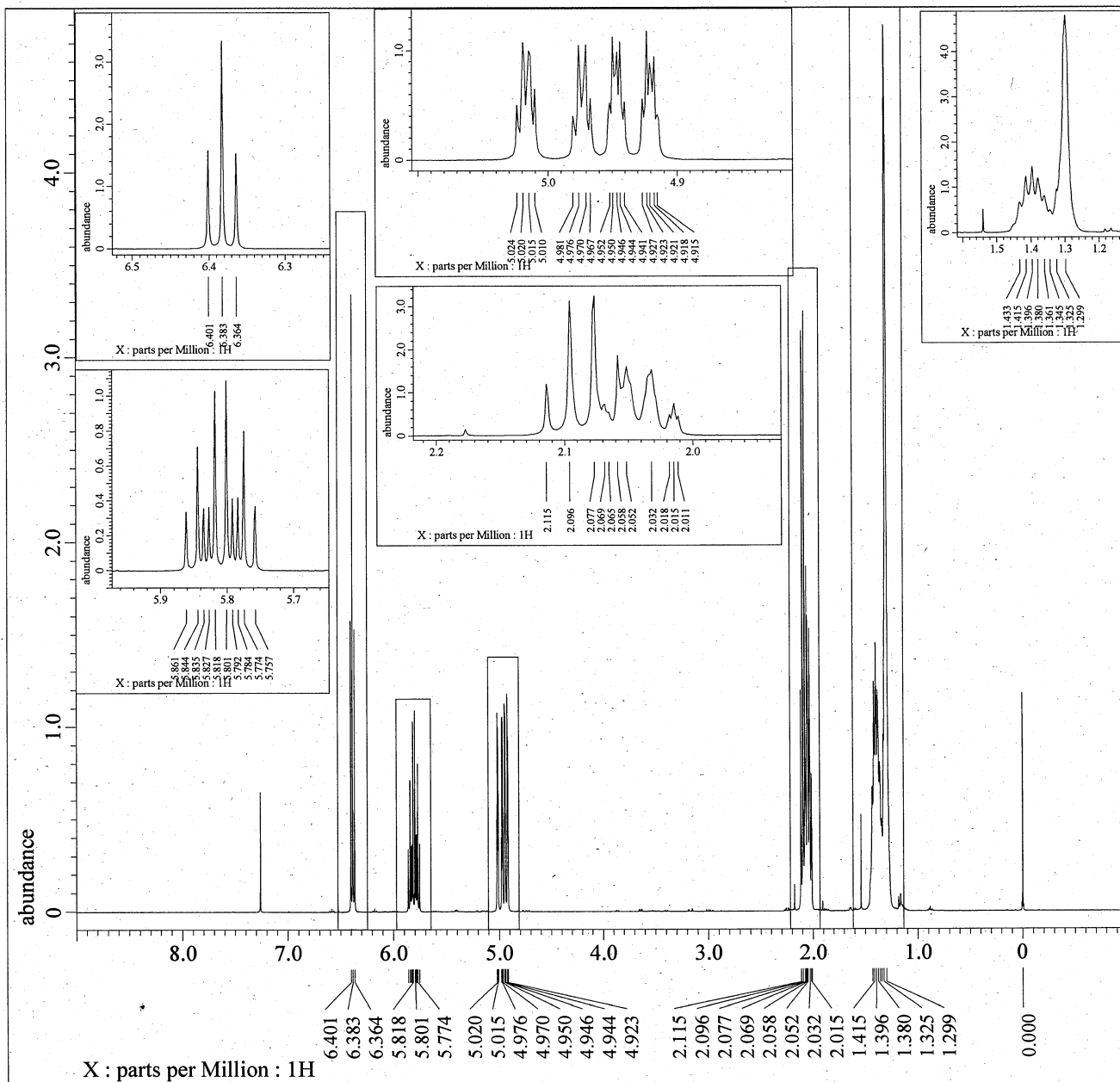


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Solvent	= CHLOROFORM-D
Creation Time	= 3-MAR-2018 12:42:03
Revision Time	= 14-JUN-2018 20:51:53
Current Time	= 14-JUN-2018 20:52:59
Comment	= single pulse decoupl
Data Format	= 1D COMPLEX
Dim Size	= 26214
Dim Title	= 13C
Dim Units	= [ppm]
Dimensions	= X
Site	= ECS 400
Spectrometer	= JNM-ECS400
Field Strength	= 9.20197068[T] (390[M
X_Acq_Duration	= 1.06430464[s]
X_Domain	= 13C
X_Freq	= 98.51479726[MHz]
X_Offset	= 100[ppm]
X_Points	= 32768
X_Prescans	= 4
X_Resolution	= 0.93958061[Hz]
X_Sweep	= 30.78817734[kHz]
Irr_Domain	= 1H
Irr_Freq	= 391.78655441[MHz]
Irr_Offset	= 5[ppm]
Clipped	= FALSE
Scans	= 256
Total Scans	= 256
Relaxation_Delay	= 2[s]
Recvr_Gain	= 60
Temp_Get	= 21.2[dC]
X_90_Width	= 9.11[us]
X_Acq_Time	= 1.06430464[s]
X_Angle	= 30[deg]
X_Atn	= 4.9[dB]
X_Pulse	= 3.03666667[us]





**JEOL**  
Solutions for Innovation

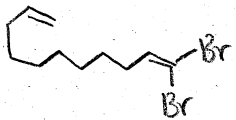
---- PROCESSING PARAMETERS ----

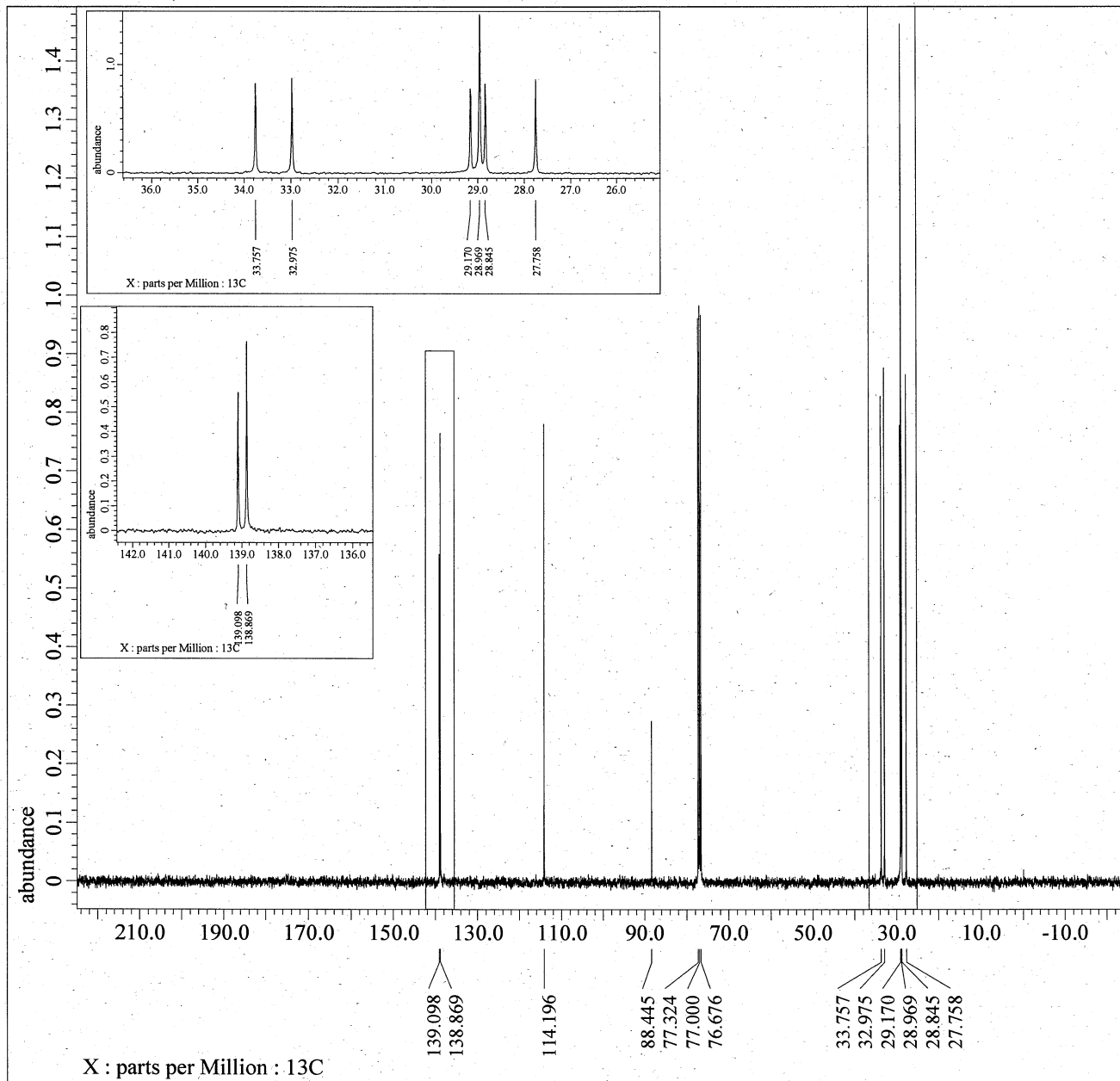
```

dc_balance( 0, FALSE )
sexp( 0.2[Hz], 0.0[s] )
trapezoid3( 0[%], 80[%], 100[%] )
zerofill( 1 )
fft( 1, TRUE, TRUE )
machinephase
ppm
  
```

以下に由来: PYD-120\_1H-2.jdf

Filename	= PYD-120_1H-5.jdf
Author	= element
Experiment	= single_pulse.ex2
Sample Id	= 120
Solvent	= CHLOROFORM-D
Creation Time	= 5-MAR-2018 14:43:03
Revision Time	= 14-JUN-2018 20:56:43
Current Time	= 14-JUN-2018 21:00:54
Comment	= single_pulse
Data Format	= 1D COMPLEX
Dim Size	= 13107
Dim Title	= 1H
Dim Units	= [ppm]
Dimensions	= X
Site	= ECS 400
Spectrometer	= JNM-ECS400
Field Strength	= 9.20197068[T] (390[M
X_Acq_Duration	= 2.228224[s]
X_Domain	= 1H
X_Freq	= 391.78655441[MHz]
X_Offset	= 5[ppm]
X_Points	= 16384
X_Prescans	= 1
X_Resolution	= 0.44878791[Hz]
X_Sweep	= 7.35294118[kHz]
Irr_Domain	= 1H
Irr_Freq	= 391.78655441[MHz]
Irr_Offset	= 5[ppm]
Tri_Domain	= 1H
Tri_Freq	= 391.78655441[MHz]
Tri_Offset	= 5[ppm]
Clipped	= FALSE
Scans	= 8
Total_Scans	= 8
Relaxation_Delay	= 5[s]
Recvr_Gain	= 30
Temp_Get	= 19.7[dC]
X_90_Width	= 11.04[us]
X_Acq_Time	= 2.228224[s]





---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 2.0[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

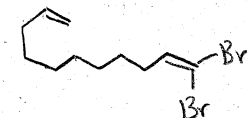
以下に由来: : PYD-120\_13C-2.jdf

Filename = PYD-120\_13C-4.jdf  
 Author = element  
 Experiment = single\_pulse\_dec  
 Sample Id = 120  
 Solvent = CHLOROFORM-D  
 Creation Time = 5-MAR-2018 14:56:39  
 Revision Time = 14-JUN-2018 21:03:14  
 Current Time = 14-JUN-2018 21:06:04

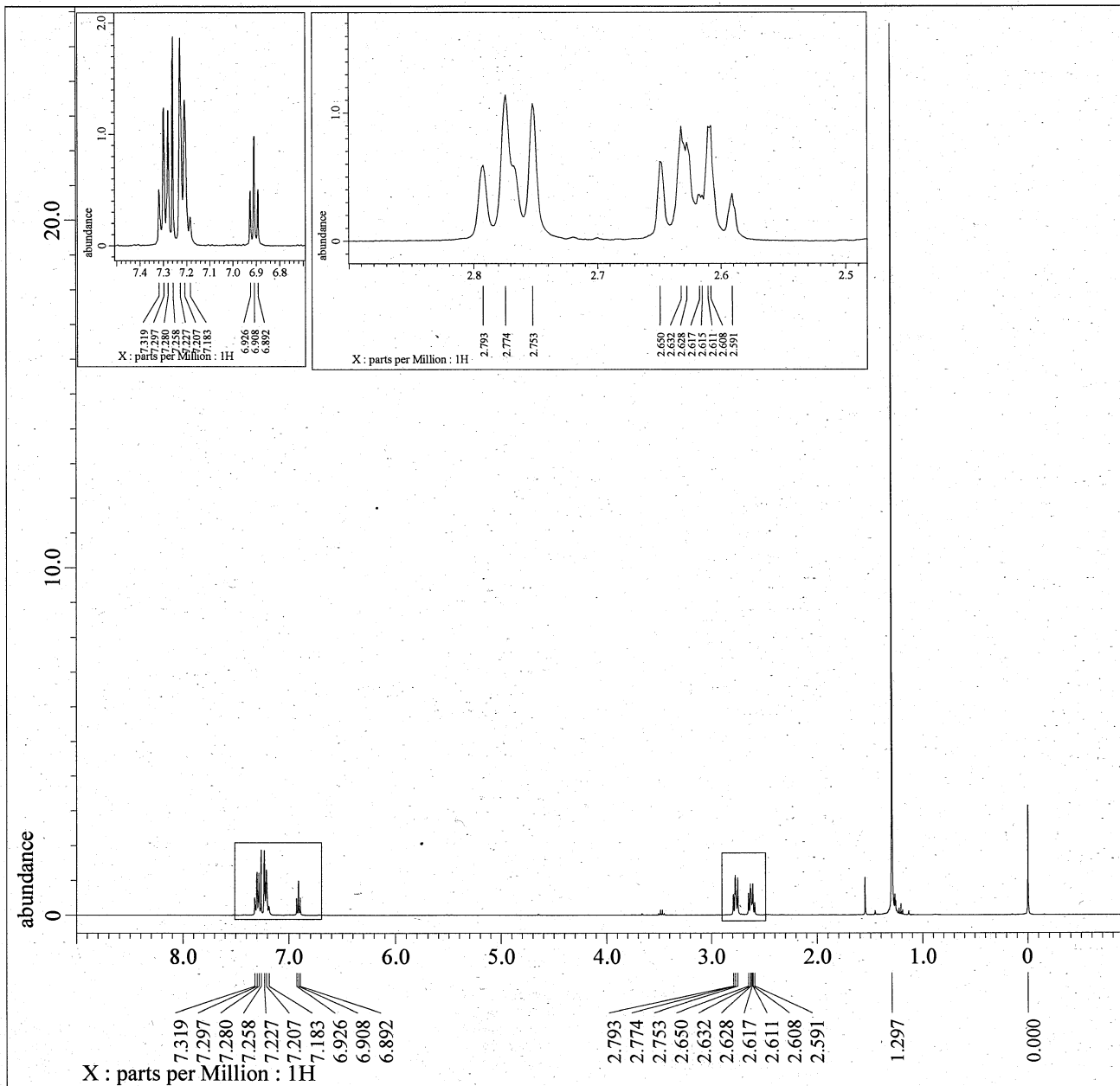
Comment = single pulse decoupl  
 Data Format = 1D COMPLEX  
 Dim Size = 26214  
 Dim Title = 13C  
 Dim Units = [ppm]  
 Dimensions = X  
 Site = ECS 400  
 Spectrometer = JNM-ECS400

Field Strength = 9.20197068[T] (390[M  
 X\_Acq\_Duration = 1.06430464[s]  
 X\_Domain = 13C  
 X\_Freq = 98.51479726[MHz]  
 X\_Offset = 100[ppm]  
 X\_Points = 32768  
 X\_Prescans = 4  
 X\_Resolution = 0.93958061[Hz]  
 X\_Sweep = 30.78817734[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 391.78655441[MHz]  
 Irr\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 256  
 Total Scans = 256

Relaxation\_Delay = 2[s]  
 Recvr\_Gain = 60  
 Temp\_Get = 19.7[dC]  
 X\_90\_Width = 9.11[us]  
 X\_Acq\_Time = 1.06430464[s]  
 X\_Angle = 30[deg]  
 X\_Atn = 4.9[dB]  
 X\_Pulse = 3.03666667[us]



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**JEOL**  
Solutions for Innovation

---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 0.2[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

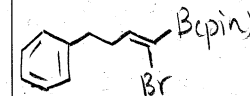
以下に由来: : PYD-079H-4-2.jdf

Filename = PYD-079H-4-6.jdf  
 Author = element  
 Experiment = single\_pulse.ex2  
 Sample\_Id = S#809784  
 Solvent = CHLOROFORM-D  
 Creation\_Time = 15-JAN-2018 21:11:23  
 Revision\_Time = 14-JUN-2018 21:17:29  
 Current\_Time = 14-JUN-2018 21:17:38

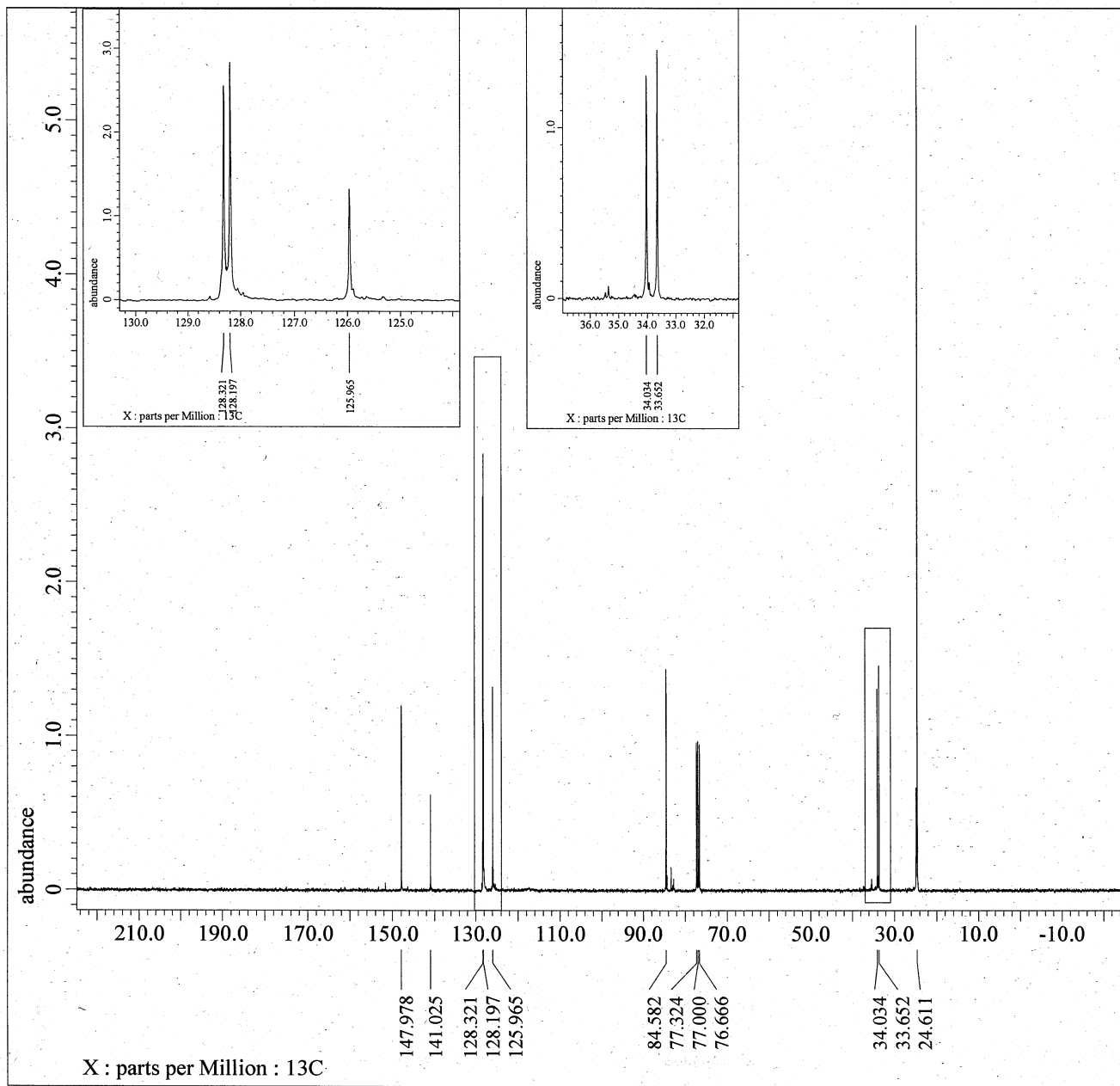
Comment = single pulse  
 Data\_Format = 1D COMPLEX  
 Dim\_Size = 13107  
 Dim\_Title = 1H  
 Dim\_Units = [ppm]  
 Dimensions = X  
 Site = ECS 400  
 Spectrometer = JNM-ECS400

Field Strength = 9.20197068[T] (390[M  
 X\_Acq\_Duration = 2.228224[s]  
 X\_Domain = 1H  
 X\_Freq = 391.78655441[MHz]  
 X\_Offset = 5[ppm]  
 X\_Points = 16384  
 X\_Prescans = 1  
 X\_Resolution = 0.44878791[Hz]  
 X\_Sweep = 7.35294118[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 391.78655441[MHz]  
 Irr\_Offset = 5[ppm]  
 Tri\_Domain = 1H  
 Tri\_Freq = 391.78655441[MHz]  
 Tri\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 8  
 Total\_Scans = 8

Relaxation\_Delay = 5[s]  
 Recvr\_Gain = 46  
 Temp\_Get = 19.9[dC]  
 X\_90\_Width = 11.04[us]  
 X\_Acq\_Time = 2.228224[s]



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**JEOL**  
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---- PROCESSING PARAMETERS ----

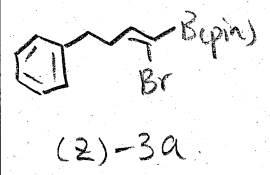
```

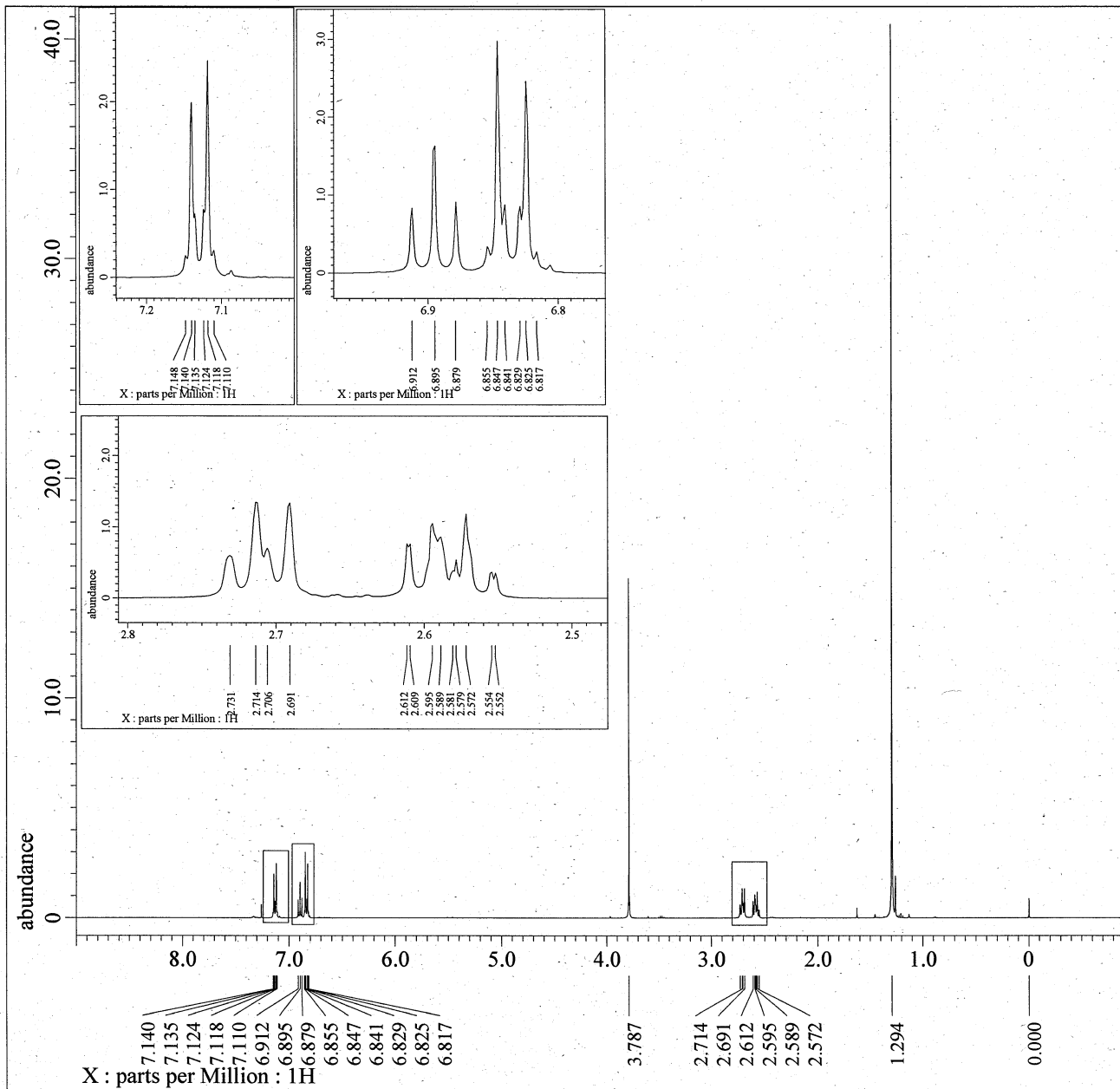
dc_balance( 0, FALSE )
sexp( 2.0[Hz], 0.0[s] )
trapezoid3( 0[%], 80[%], 100[%] )
zerofill( 1 )
fft( 1, TRUE, TRUE )
machinephase
ppm

以下に由来: : PYD-079C-2.jdf

```

Filename	= PYD-079C-5.jdf
Author	= element
Experiment	= single_pulse_dec
Sample Id	= 079
Solvent	= CHLOROFORM-D
Creation Time	= 22-MAR-2018 18:59:23
Revision Time	= 14-JUN-2018 21:20:46
Current Time	= 14-JUN-2018 21:22:07
Comment	= single pulse decoupl
Data Format	= 1D COMPLEX
Dim Size	= 26214
Dim Title	= 13C
Dim Units	= [ppm]
Dimensions	= X
Site	= ECS 400
Spectrometer	= JNM-ECS400
Field Strength	= 9.20197068[T] (390[M
X_Acq_Duration	= 1.06430464[s]
X_Domain	= 13C
X_Freq	= 98.51479726[MHz]
X_Offset	= 100[ppm]
X_Points	= 32768
X_Prescans	= 4
X_Resolution	= 0.93958061[Hz]
X_Sweep	= 30.78817734[kHz]
Irr_Domain	= 1H
Irr_Freq	= 391.78655441[MHz]
Irr_Offset	= 5[ppm]
Clipped	= FALSE
Scans	= 200
Total Scans	= 200
Relaxation_Delay	= 2[s]
Recvr Gain	= 60
Temp_Get	= 20.2[dC]
X_90_Width	= 9.11[us]
X_Acq_Time	= 1.06430464[s]
X_Angle	= 30[deg]
X_Atn	= 4.9[dB]
X_Pulse	= 3.03666667[us]





---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 0.2[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

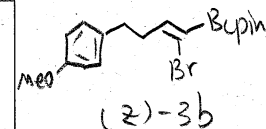
以下に由来: : PYD-136-2H-2.jdf

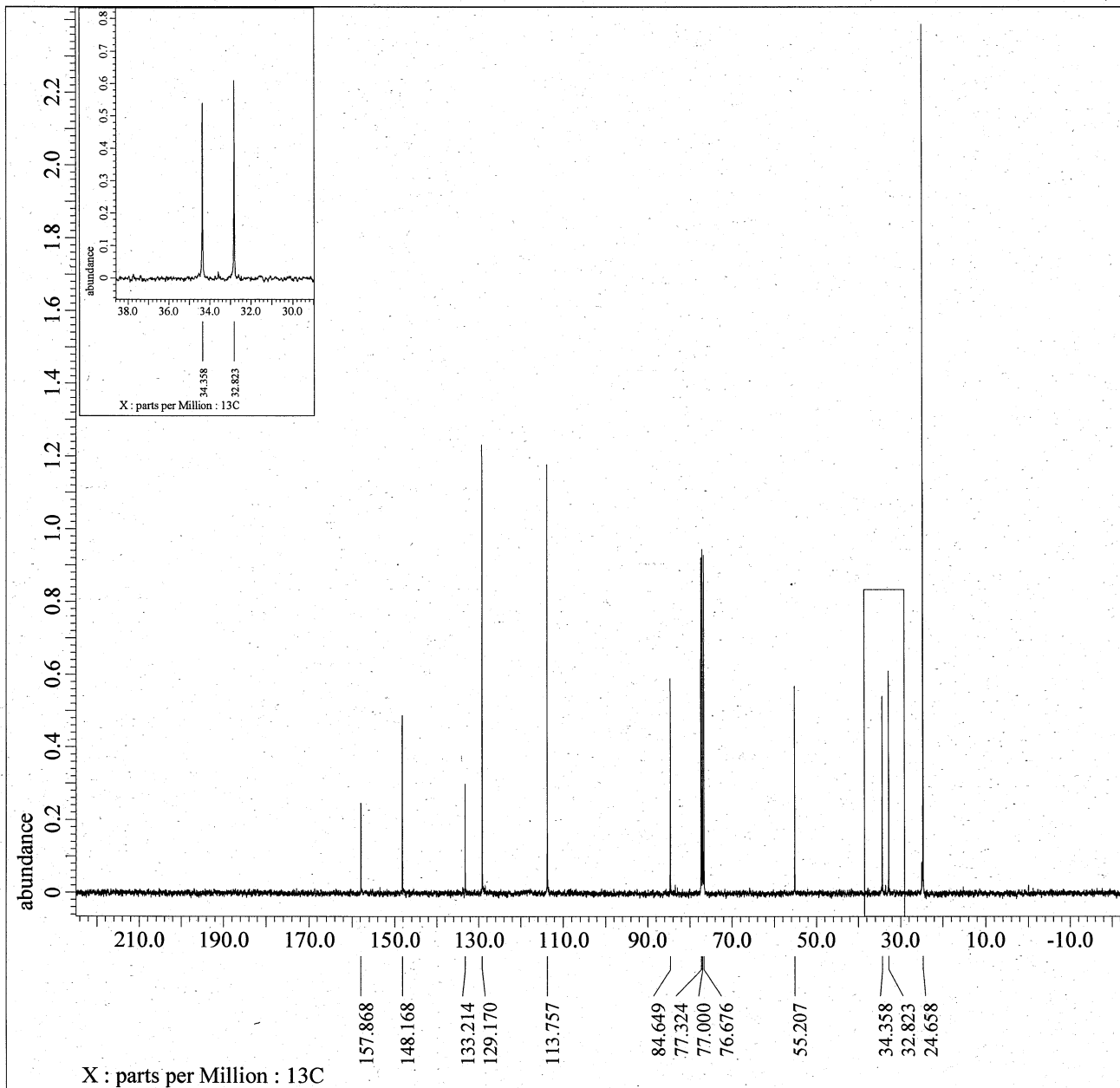
Filename = PYD-136-2H-5.jdf  
 Author = element  
 Experiment = single\_pulse.ex2  
 Sample\_Id = 136  
 Solvent = CHLOROFORM-D  
 Creation\_Time = 22-MAR-2018 15:54:17  
 Revision\_Time = 14-JUN-2018 22:31:43  
 Current\_Time = 14-JUN-2018 22:33:31

Comment = single\_pulse  
 Data\_Format = 1D COMPLEX  
 Dim\_Size = 13107  
 Dim\_Title = 1H  
 Dim\_Units = [ppm]  
 Dimensions = X  
 Site = ECS 400  
 Spectrometer = JNM-ECS400

Field\_Strength = 9.20197068[T] (390[M]  
 X\_Acq\_Duration = 2.228224[s]  
 X\_Domain = 1H  
 X\_Freq = 391.78655441[MHz]  
 X\_Offset = 5[ppm]  
 X\_Points = 16384  
 X\_Prescans = 1  
 X\_Resolution = 0.44878791[Hz]  
 X\_Sweep = 7.35294118[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 391.78655441[MHz]  
 Irr\_Offset = 5[ppm]  
 Tri\_Domain = 1H  
 Tri\_Freq = 391.78655441[MHz]  
 Tri\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 8  
 Total\_Scans = 8

Relaxation\_Delay = 5[s]  
 Recvr\_Gain = 30  
 Temp\_Get = 19.9[dC]  
 X\_90\_Width = 11.04[us]  
 X\_Acq\_Time = 2.228224[s]





---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 2.0[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

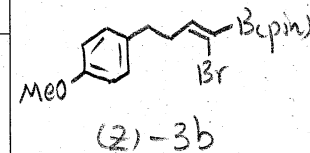
以下に由来: : PYD-136C-2.jdf

Filename = PYD-136C-5.jdf  
 Author = element  
 Experiment = single\_pulse\_dec  
 Sample Id = 136  
 Solvent = CHLOROFORM-D  
 Creation Time = 22-MAR-2018 16:08:55  
 Revision Time = 14-JUN-2018 21:30:18  
 Current Time = 14-JUN-2018 21:31:11

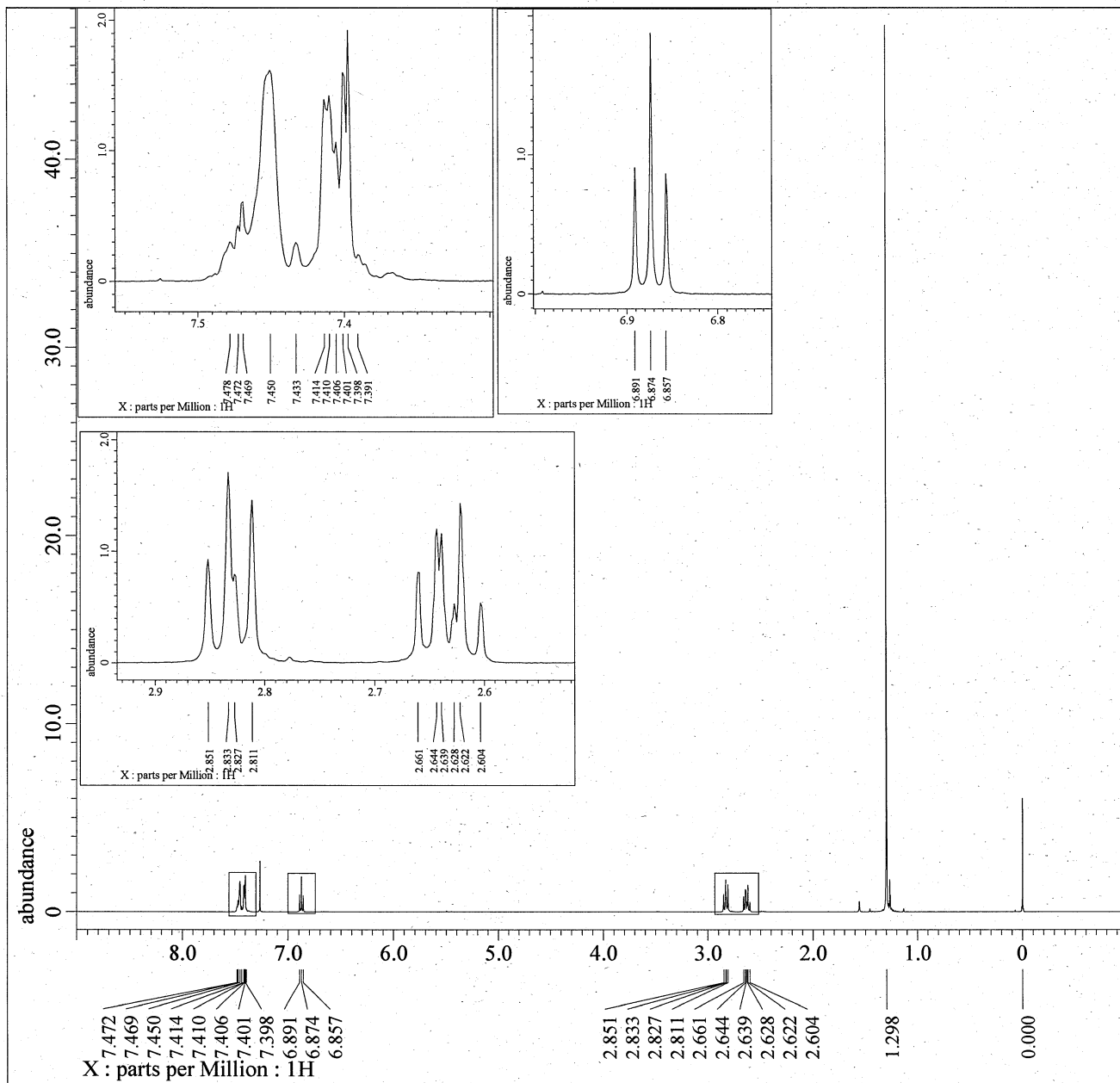
Comment = single pulse decoupl  
 Data Format = 1D COMPLEX  
 Dim Size = 26214  
 Dim Title = 13C  
 Dim Units = [ppm]  
 Dimensions = X  
 Site = ECS 400  
 Spectrometer = JNM-ECS400

Field Strength = 9.20197068[T] (390 M  
 X Acq Duration = 1.06430464[s]  
 X Domain = 13C  
 X Freq = 98.51479726[MHz]  
 X Offset = 100[ppm]  
 X Points = 32768  
 X Prescans = 4  
 X Resolution = 0.93958061[Hz]  
 X Sweep = 30.78817734[kHz]  
 Irr Domain = 1H  
 Irr Freq = 391.78655441[MHz]  
 Irr Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 256  
 Total Scans = 256

Relaxation\_Delay = 2[s]  
 Recvr Gain = 60  
 Temp\_Get = 20[dc]  
 X 90\_Width = 9.11[us]  
 X Acq Time = 1.06430464[s]  
 X\_Angle = 30[deg]  
 X\_Atn = 4.9[dB]  
 X\_Pulse = 3.03666667[us]







---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 0.2[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

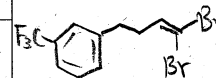
以下に由来: : PYD-124H-2.jdf

Filename = PYD-124H-5.jdf  
 Author = element  
 Experiment = single\_pulse.ex2  
 Sample Id = S#685461  
 Solvent = CHLOROFORM-D  
 Creation\_Time = 22-FEB-2018 17:39:02  
 Revision\_Time = 14-JUN-2018 21:35:03  
 Current\_Time = 14-JUN-2018 21:36:55

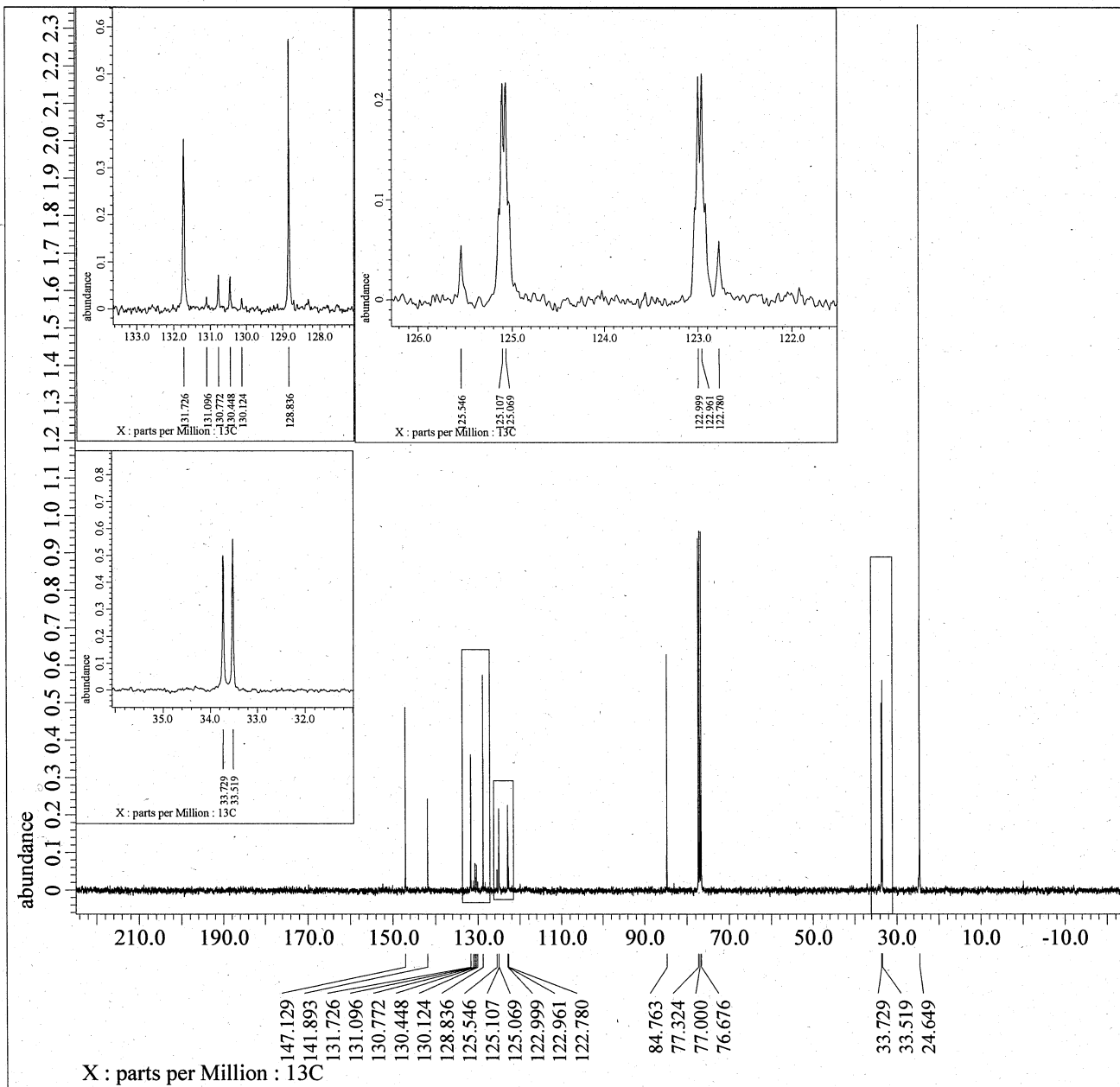
Comment = single\_pulse  
 Data\_Format = 1D COMPLEX  
 Dim Size = 13107  
 Dim Title = 1H  
 Dim\_Units = [ppm]  
 Dimensions = X  
 Site = ECS 400  
 Spectrometer = JNM-ECS400

Field Strength = 9.20197068[T] (390[M  
 X\_Acq\_Duration = 2.228224[s]  
 X\_Domain = 1H  
 X\_Freq = 391.78655441[MHz]  
 X\_Offset = 5[ppm]  
 X\_Points = 16384  
 X\_Prescans = 1  
 X\_Resolution = 0.44878791[Hz]  
 X\_Sweep = 7.35294118[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 391.78655441[MHz]  
 Irr\_Offset = 5[ppm]  
 Tri\_Domain = 1H  
 Tri\_Freq = 391.78655441[MHz]  
 Tri\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 8  
 Total\_Scans = 8

Relaxation\_Delay = 5[s]  
 Recvr\_Gain = 44  
 Temp\_Get = 19.6[dC]  
 X\_90\_Width = 11.04[us]  
 X\_Acq\_Time = 2.228224[s]



(2)-3C



---- PROCESSING PARAMETERS ----  
 dc balance( 0, FALSE )  
 sexp( 2.0[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

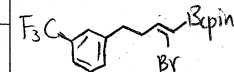
以下に由来: : PYD-124-2C-2.jdf

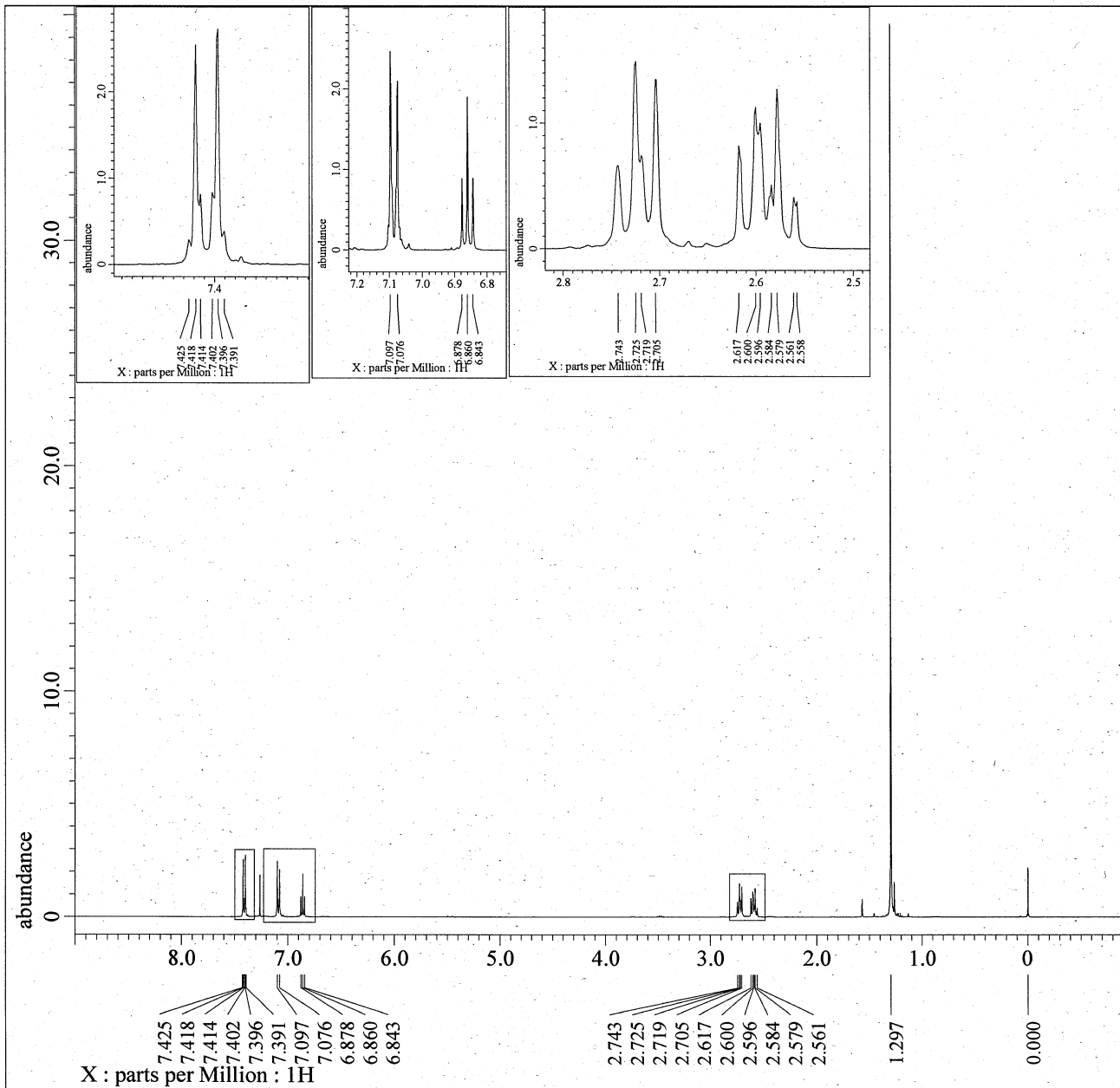
Filename = PYD-124-2C-5.jdf  
 Author = element  
 Experiment = single\_pulse\_dec  
 Sample\_Id = 124  
 Solvent = CHLOROFORM-D  
 Creation Time = 23-MAR-2018 13:16:22  
 Revision Time = 5-AUG-2018 16:24:10  
 Current Time = 5-AUG-2018 16:26:10

Comment = single pulse decoupl  
 Data Format = 1D COMPLEX  
 Dim Size = 26214  
 Dim Title = 13C  
 Dim Units = [ppm]  
 Dimensions = X  
 Site = ECS 400  
 Spectrometer = JNM-ECS400

Field Strength = 9.20197068[T] (390[M  
 X\_Acq\_Duration = 1.06430464[s]  
 X\_Domain = 13C  
 X\_Freq = 98.51479726[MHz]  
 X\_Offset = 100[ppm]  
 X Points = 32768  
 X\_Prescans = 4  
 X\_Resolution = 0.93958061[Hz]  
 X\_Sweep = 30.78817734[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 391.78655441[MHz]  
 Irr\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 256  
 Total Scans = 256

Relaxation\_Delay = 2[s]  
 Recvr Gain = 60  
 Temp\_Get = 19.4[dc]  
 X\_90\_Width = 9.11[us]  
 X\_Acq\_Time = 1.06430464[s]  
 X\_Angle = 30[deg]  
 X\_Atn = 4.9[dB]  
 X\_Pulse = 3.03666667[us]





---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 0.2[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

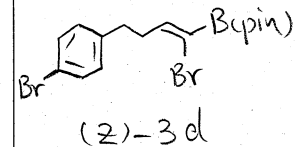
以下に由来: : PYD-135H-2.jdf

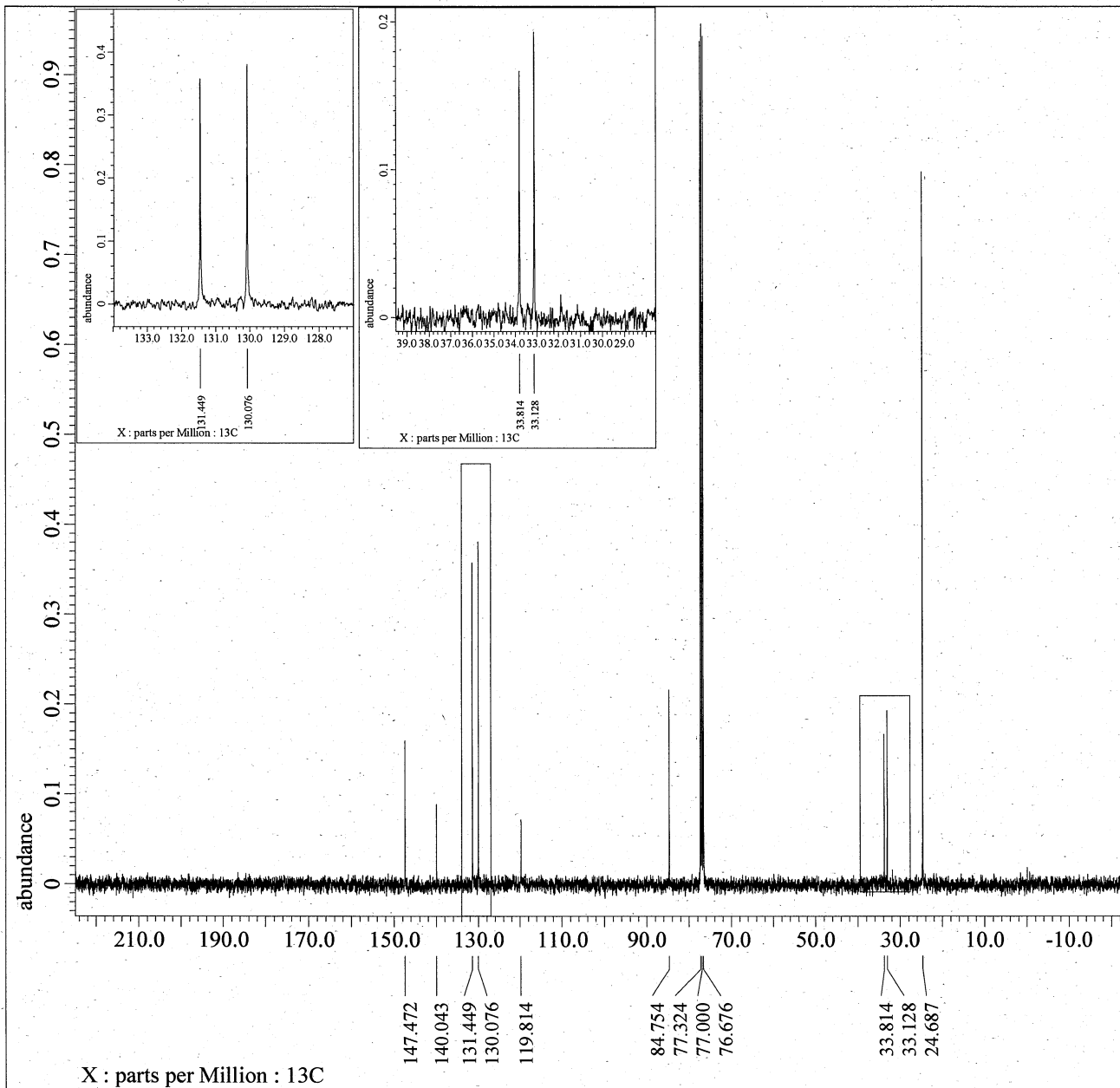
Filename = PYD-135H-5.jdf  
 Author = element  
 Experiment = single\_pulse.ex2  
 Sample Id = 135  
 Solvent = CHLOROFORM-D  
 Creation\_Time = 22-MAR-2018 12:31:11  
 Revision\_Time = 14-JUN-2018 21:47:26  
 Current\_Time = 14-JUN-2018 21:48:12

Comment = single\_pulse  
 Data\_Format = 1D\_COMPLEX  
 Dim Size = 13107  
 Dim Title = 1H  
 Dim Units = [ppm]  
 Dimensions = X  
 Site = ECS 400  
 Spectrometer = JNM-ECS400

Field Strength = 9.20197068[T] (390[M  
 X\_Acq\_Duration = 2.228224[s]  
 X\_Domain = 1H  
 X\_Freq = 391.78655441[MHz]  
 X\_Offset = 5[ppm]  
 X\_Points = 16384  
 X\_Prescans = 1  
 X\_Resolution = 0.44878791[Hz]  
 X\_Sweep = 7.35294118[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 391.78655441[MHz]  
 Irr\_Offset = 5[ppm]  
 Tri\_Domain = 1H  
 Tri\_Freq = 391.78655441[MHz]  
 Tri\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 8  
 Total\_Scans = 8

Relaxation\_Delay = 5[s]  
 Recvr\_Gain = 40  
 Temp\_Get = 19.7[dc]  
 X\_90\_Width = 11.04[us]  
 X\_Acq\_Time = 2.228224[s]





---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 2.0[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

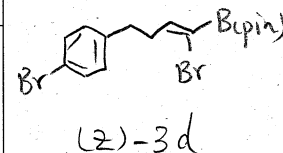
以下に由来: : PYD-135C-2. jdf

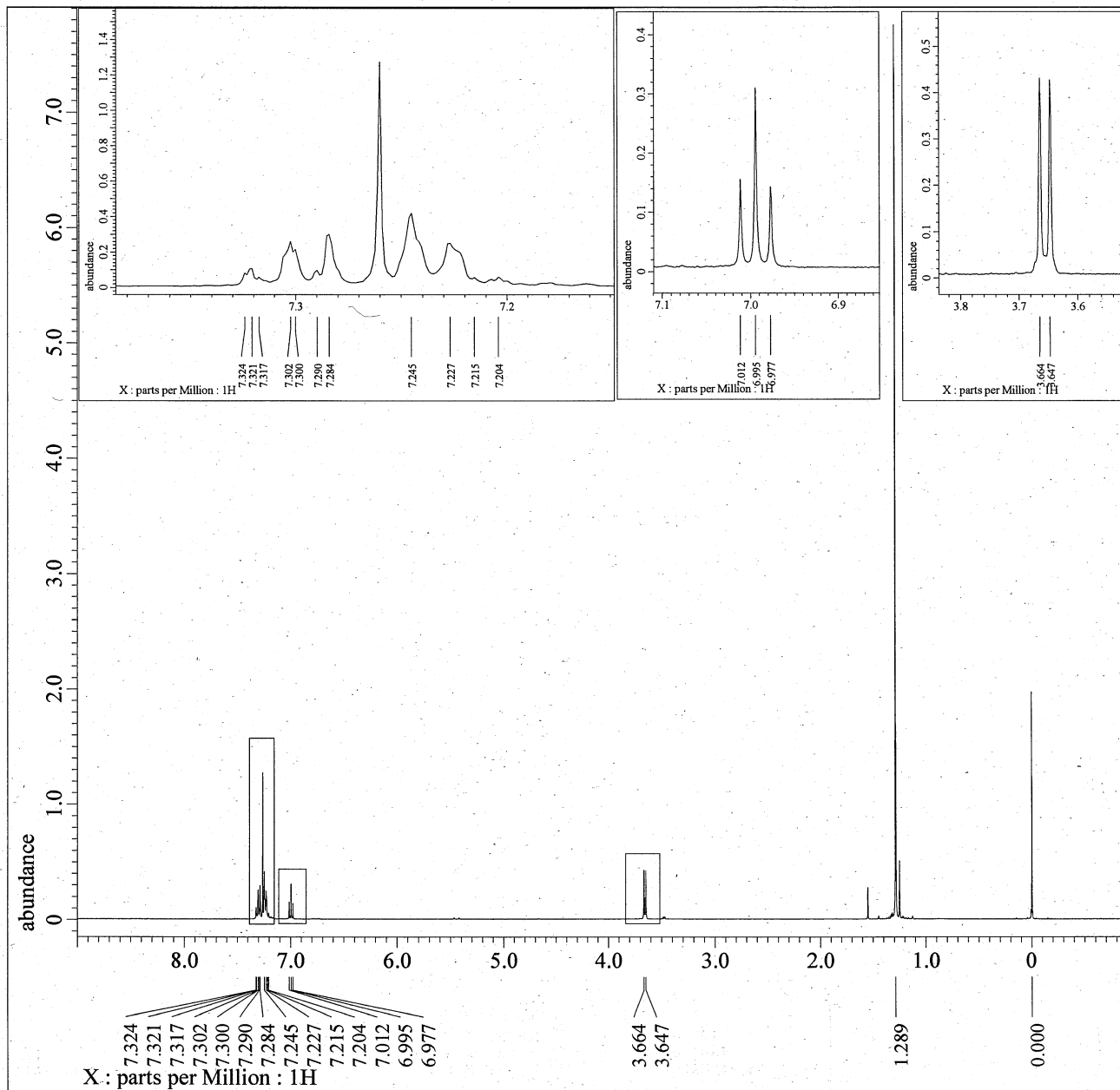
Filename = PYD-135C-4. jdf  
 Author = element  
 Experiment = single\_pulse\_dec  
 Sample Id = 135  
 Solvent = CHLOROFORM-D  
 Creation Time = 22-MAR-2018 12:45:32  
 Revision Time = 14-JUN-2018 21:50:33  
 Current Time = 14-JUN-2018 21:51:21

Comment = single pulse decoupl  
 Data Format = 1D COMPLEX  
 Dim Size = 26214  
 Dim Title = 13C  
 Dim Units = [ppm]  
 Dimensions = X  
 Site = ECS 400  
 Spectrometer = JNM-ECS400

Field Strength = 9.20197068[T] (390[M  
 X Acq Duration = 1.06430464[s]  
 X Domain = 13C  
 X Freq = 98.51479726[MHz]  
 X Offset = 100[ppm]  
 X Points = 32768  
 X Prescans = 4  
 X Resolution = 0.93958061[Hz]  
 X Sweep = 30.78817734[kHz]  
 Irr Domain = 1H  
 Irr Freq = 391.78655441[MHz]  
 Irr Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 256  
 Total Scans = 256

Relaxation\_Delay = 2[s]  
 Recvr Gain = 60  
 Temp\_Get = 20[dc]  
 X 90\_Width = 9.11[us]  
 X Acq Time = 1.06430464[s]  
 X\_Angle = 30[deg]  
 X\_Atn = 4.9[db]  
 X\_Pulse = 3.03666667[us]



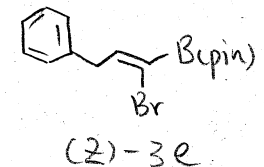


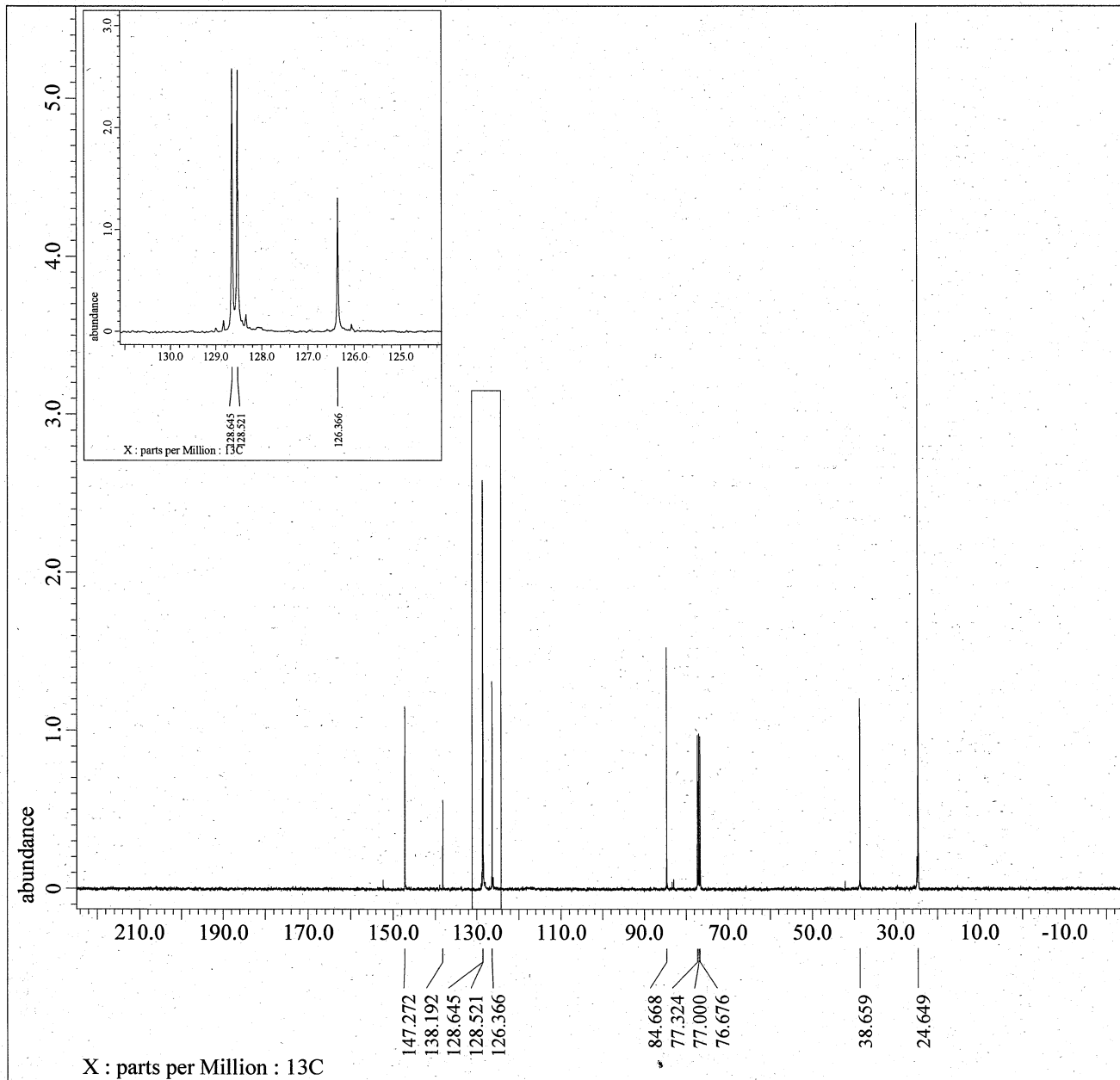
**JEOL**  
Solutions for Innovation

---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 0.2[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

以下に由来: : PYD-103H-2-2.jdf

Filename	= PYD-103H-2-5.jdf
Author	= element
Experiment	= single_pulse.ex2
Sample Id	= S#590130
Solvent	= CHLOROFORM-D
Creation Time	= 1-FEB-2018 16:01:56
Revision Time	= 14-JUN-2018 21:55:25
Current Time	= 14-JUN-2018 21:56:32
Comment	= single_pulse
Data Format	= 1D_COMPLEX
Dim Size	= 13107
Dim Title	= 1H
Dim Units	= [ppm]
Dimensions	= X
Site	= ECX 400P
Spectrometer	= DELTA2_NMR
Field Strength	= 9.2982153[T] (400[MH
X_Acq_Duration	= 2.20725248[s]
X_Domain	= 1H
X_Freq	= 395.88430144[MHz]
X_Offset	= 5[ppm]
X_Points	= 16384
X_Prescans	= 1
X_Resolution	= 0.45305193[Hz]
X_Sweep	= 7.42280285[kHz]
Irr_Domain	= 1H
Irr_Freq	= 395.88430144[MHz]
Irr_Offset	= 5[ppm]
Tri_Domain	= 1H
Tri_Freq	= 395.88430144[MHz]
Tri_Offset	= 5[ppm]
Clipped	= FALSE
Scans	= 8
Total_Scans	= 8
Relaxation_Delay	= 5[s]
Recvr_Gain	= 38
Temp_Get	= 21.6[dC]
X_90_Width	= 12.69[us]
X_Acq_Time	= 2.20725248[s]





---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 2.0[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

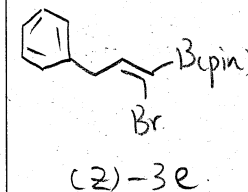
以下に由来: : PYD-103C-2.jdf

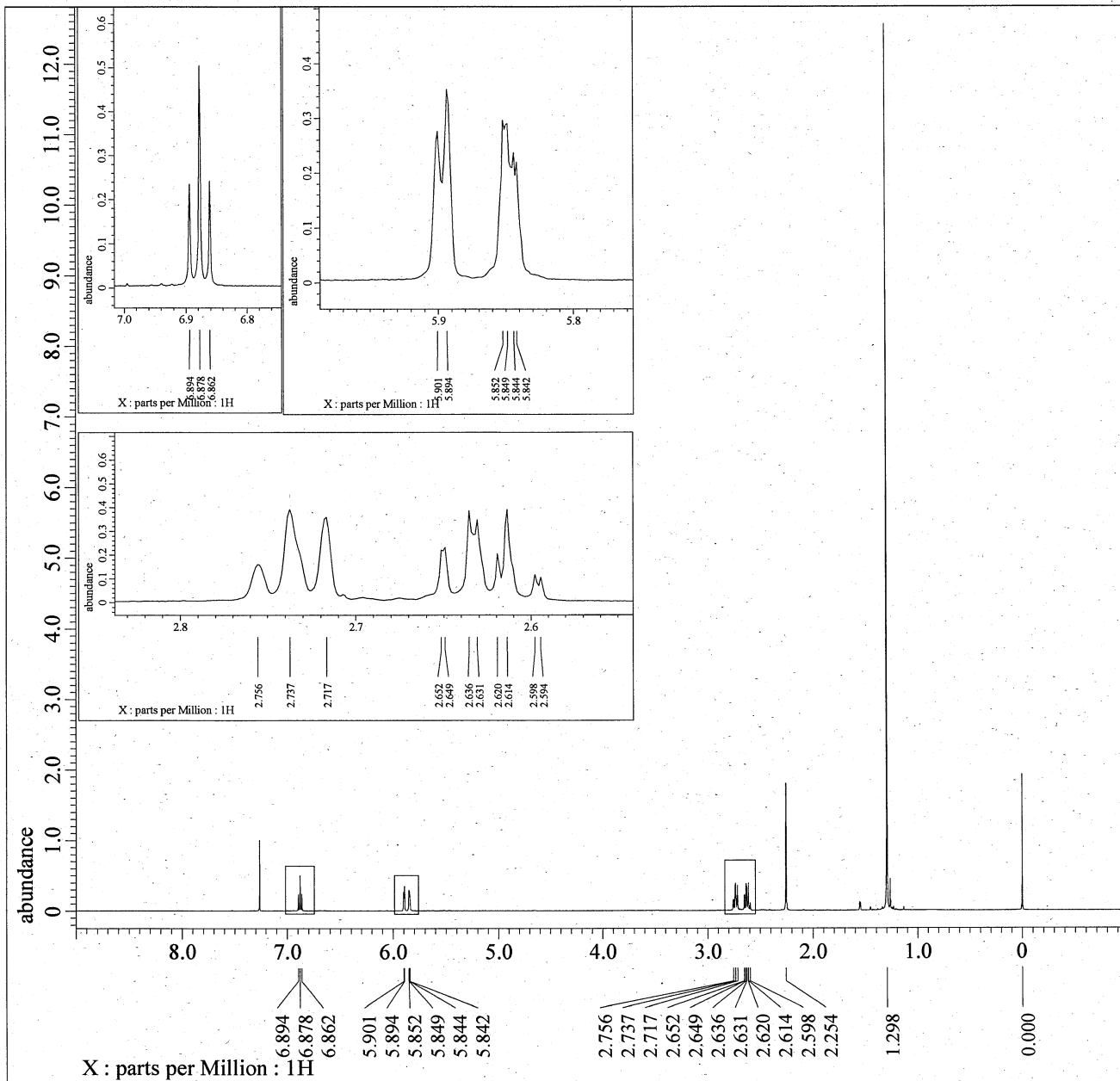
Filename = PYD-103C-5.jdf  
 Author = element  
 Experiment = single\_pulse\_dec  
 Sample\_Id = 103  
 Solvent = CHLOROFORM-D  
 Creation\_Time = 23-MAR-2018 11:42:26  
 Revision\_Time = 14-JUN-2018 21:58:36  
 Current\_Time = 14-JUN-2018 21:59:19

Comment = single pulse decoupl  
 Data\_Format = 1D COMPLEX  
 Dim\_Size = 26214  
 Dim\_Title = 13C  
 Dim\_Units = [ppm]  
 Dimensions = X  
 Site = ECS 400  
 Spectrometer = JNM-ECS400

Field\_Strength = 9.20197068[T] (390[M  
 X\_Acq\_Duration = 1.06430464[s]  
 X\_Domain = 13C  
 X\_Freq = 98.51479726[MHz]  
 X\_Offset = 100[ppm]  
 X\_Points = 32768  
 X\_Prescans = 4  
 X\_Resolution = 0.93958061[Hz]  
 X\_Sweep = 30.78817734[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 391.78655441[MHz]  
 Irr\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 200  
 Total\_Scans = 200

Relaxation\_Delay = 2[s]  
 Recvr\_Gain = 60  
 Temp\_Get = 20.3[dC]  
 X\_90\_Width = 9.11[us]  
 X\_Acq\_Time = 1.06430464[s]  
 X\_Angle = 30[deg]  
 X\_Atn = 4.9[dB]  
 X\_Pulse = 3.03666667[us]





---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 0.2[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

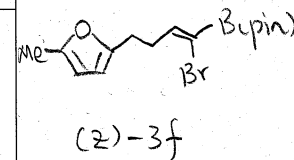
以下に由来: : PYD-109H-2.jdf

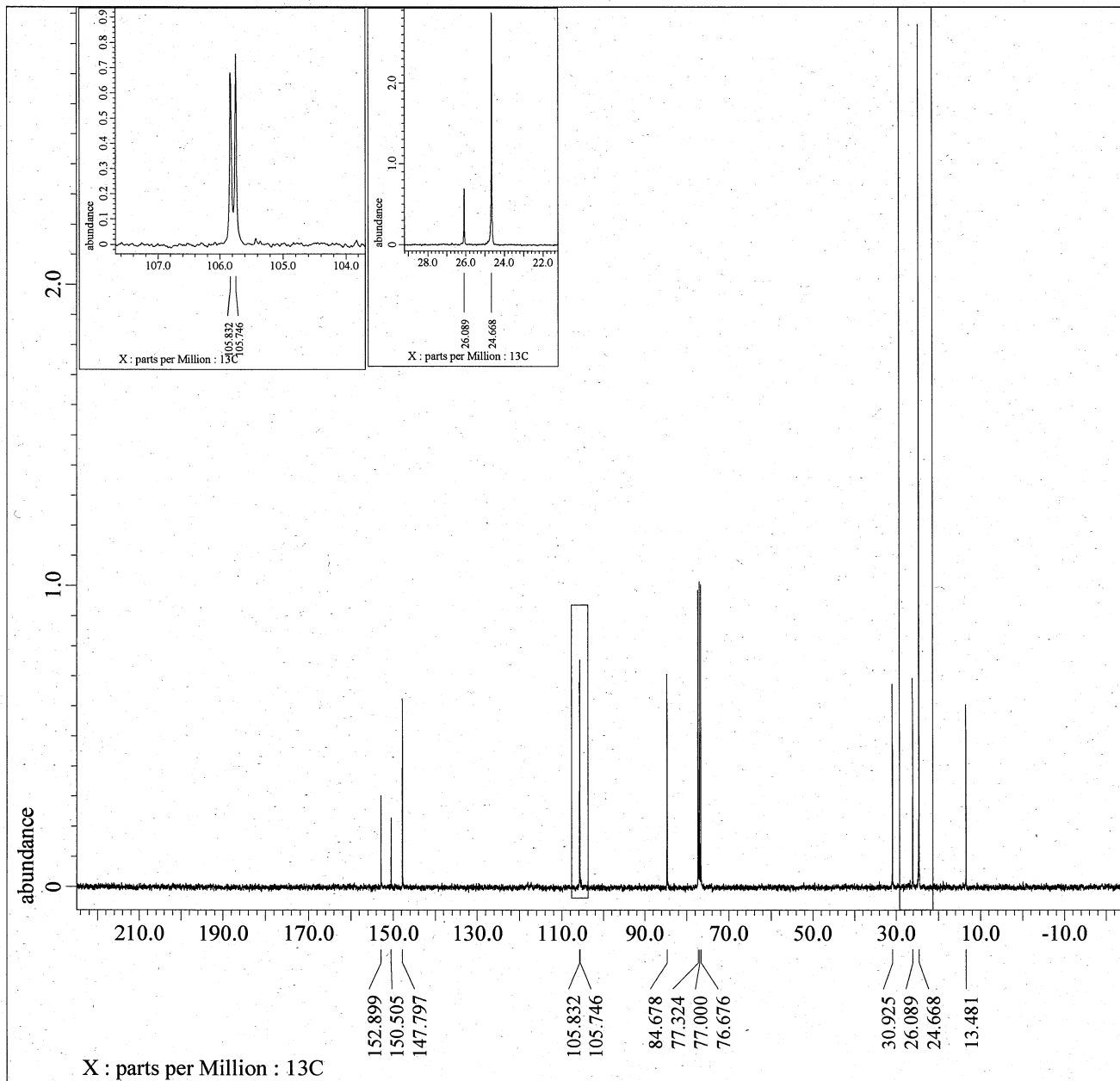
Filename = PYD-109H-5.jdf  
 Author = element  
 Experiment = single pulse.ex2  
 Sample Id = S#681652  
 Solvent = CHLOROFORM-D  
 Creation Time = 5-FEB-2018 18:34:30  
 Revision Time = 14-JUN-2018 22:02:36  
 Current Time = 14-JUN-2018 22:04:20

Comment = single pulse  
 Data Format = 1D COMPLEX  
 Dim Size = 13107  
 Dim Title = 1H  
 Dim Units = [ppm]  
 Dimensions = X  
 Site = ECX 400P  
 Spectrometer = DELTA2\_NMR

Field Strength = 9.2982153[T] (400[MH  
 X\_Acq\_Duration = 2.20725248[s]  
 X\_Domain = 1H  
 X\_Freq = 395.88430144[MHz]  
 X\_Offset = 5[ppm]  
 X\_Points = 16384  
 X\_Prescans = 1  
 X\_Resolution = 0.45305193[Hz]  
 X\_Sweep = 7.42280285[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 395.88430144[MHz]  
 Irr\_Offset = 5[ppm]  
 Tri\_Domain = 1H  
 Tri\_Freq = 395.88430144[MHz]  
 Tri\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 8  
 Total\_Scans = 8

Relaxation\_Delay = 5[s]  
 Recvr\_Gain = 36  
 Temp\_Get = 22[dc]  
 X\_90\_Width = 11.5[us]  
 X\_Acq\_Time = 2.20725248[s]





---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 2.0[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

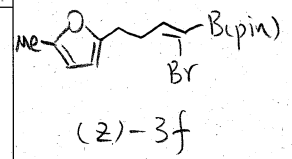
以下に由来: : PYD-109-2C-2.jdf

Filename = PYD-109-2C-4.jdf  
 Author = element  
 Experiment = single\_pulse\_dec  
 Sample\_Id = 109  
 Solvent = CHLOROFORM-D  
 Creation\_Time = 23-MAR-2018 16:20:45  
 Revision\_Time = 14-JUN-2018 22:05:50  
 Current\_Time = 14-JUN-2018 22:07:13

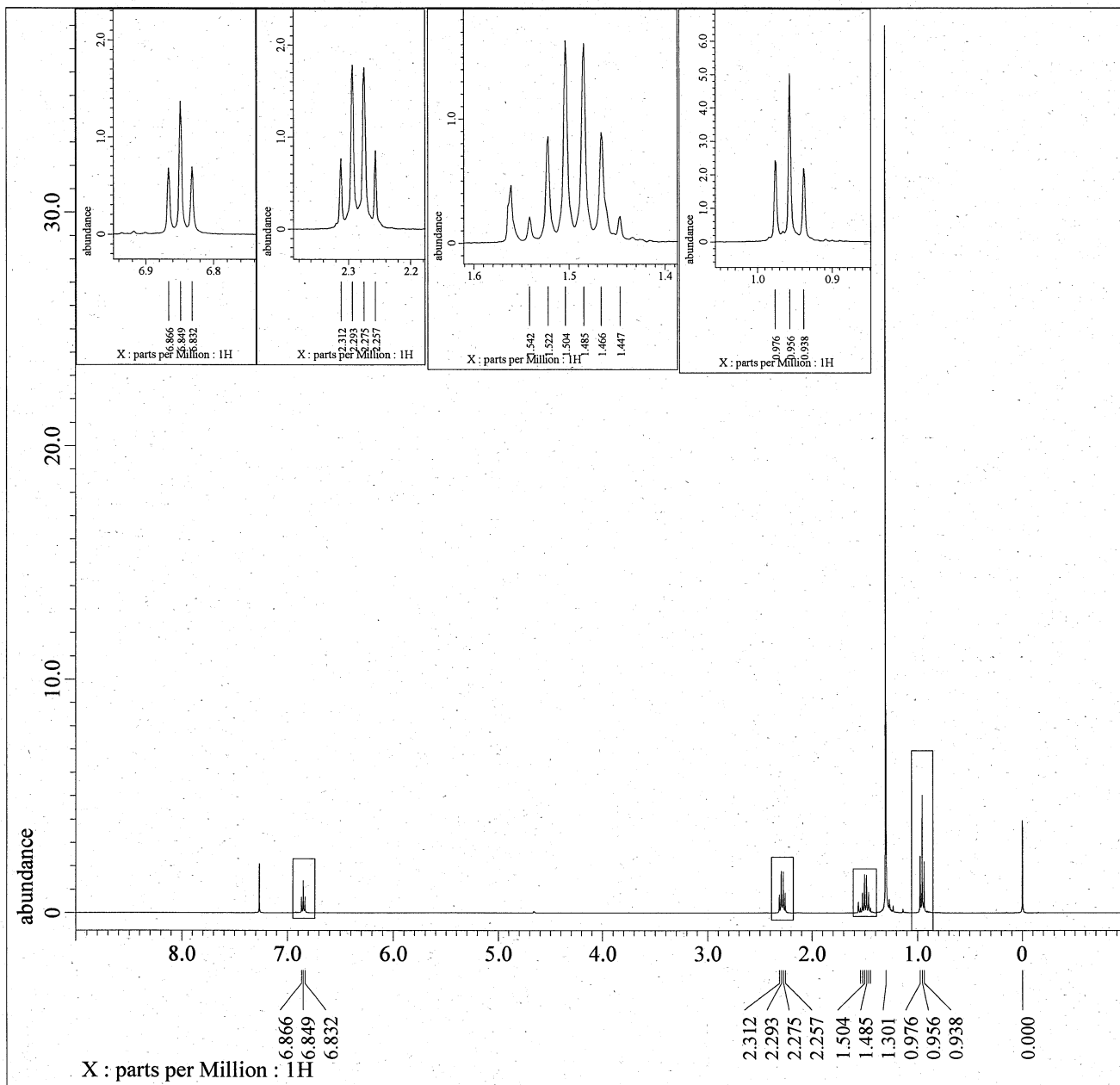
Comment = single pulse decoupl  
 Data\_Format = 1D\_COMPLEX  
 Dim\_Size = 26214  
 Dim\_Title = 13C  
 Dim\_Units = [ppm]  
 Dimensions = X  
 Site = ECS 400  
 Spectrometer = JNM-ECS400

Field\_Strength = 9.20197068[T] (390[M  
 X\_Acq\_Duration = 1.06430464[s]  
 X\_Domain = 13C  
 X\_Freq = 98.51479726[MHz]  
 X\_Offset = 100[ppm]  
 X\_Points = 32768  
 X\_Prescans = 4  
 X\_Resolution = 0.93958061[Hz]  
 X\_Sweep = 30.78817734[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 391.78655441[MHz]  
 Irr\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 200  
 Total\_Scans = 200

Relaxation\_Delay = 2[s]  
 Recvr\_Gain = 60  
 Temp\_Get = 18.3[dc]  
 X\_90\_Width = 9.11[us]  
 X\_Acq\_Time = 1.06430464[s]  
 X\_Angle = 30[deg]  
 X\_Atn = 4.9[dB]  
 X\_Pulse = 3.03666667[us]







---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 0.2[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

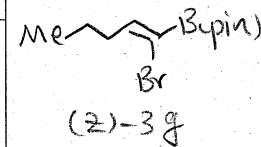
以下に由来: : PYD-107H-2.jdf

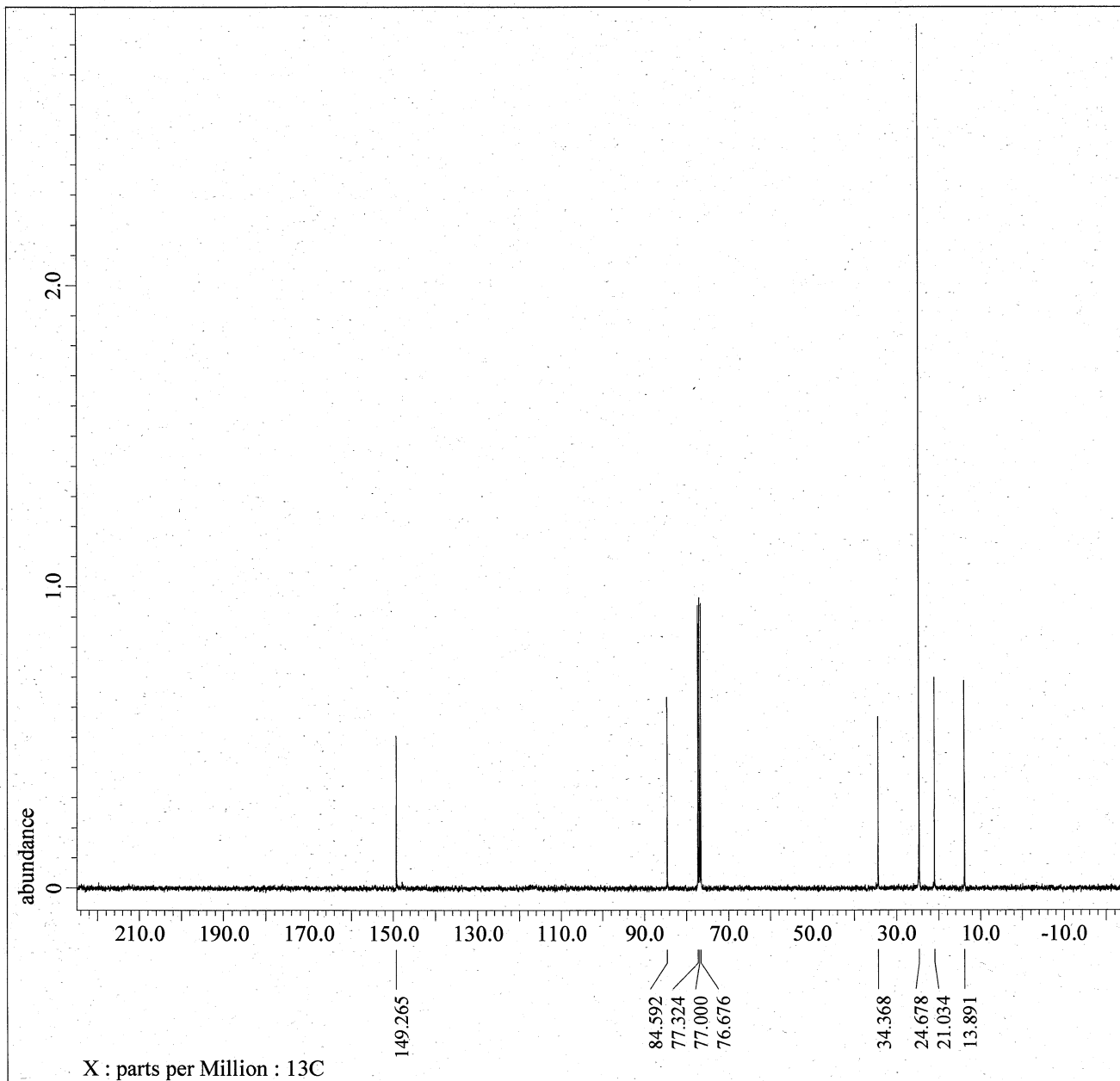
Filename = PYD-107H-5.jdf  
 Author = element  
 Experiment = single\_pulse.ex2  
 Sample\_Id = S#645261  
 Solvent = CHLOROFORM-D  
 Creation\_Time = 3-FEB-2018 16:34:43  
 Revision\_Time = 14-JUN-2018 22:10:05  
 Current\_Time = 14-JUN-2018 22:12:45

Comment = single\_pulse  
 Data\_Format = 1D\_COMPLEX  
 Dim\_Size = 13107  
 Dim\_Title = 1H  
 Dim\_Units = [ppm]  
 Dimensions = X  
 Site = ECS 400  
 Spectrometer = JNM-ECS400

Field\_Strength = 9.20197068[T] (390[M  
 X\_Acq\_Duration = 2.228224[s]  
 X\_Domain = 1H  
 X\_Freq = 391.78655441[MHz]  
 X\_Offset = 5[ppm]  
 X\_Points = 16384  
 X\_Prescans = 1  
 X\_Resolution = 0.44878791[Hz]  
 X\_Sweep = 7.35294118[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 391.78655441[MHz]  
 Irr\_Offset = 5[ppm]  
 Tri\_Domain = 1H  
 Tri\_Freq = 391.78655441[MHz]  
 Tri\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 8  
 Total\_Scans = 8

Relaxation\_Delay = 5[s]  
 Recvr\_Gain = 44  
 Temp\_Get = 19.6[dC]  
 X\_90\_Width = 11.04[us]  
 X\_Acq\_Time = 2.228224[s]





---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 2.0[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

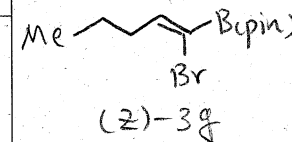
以下に由来: : PYD-107-2C-2.jdf

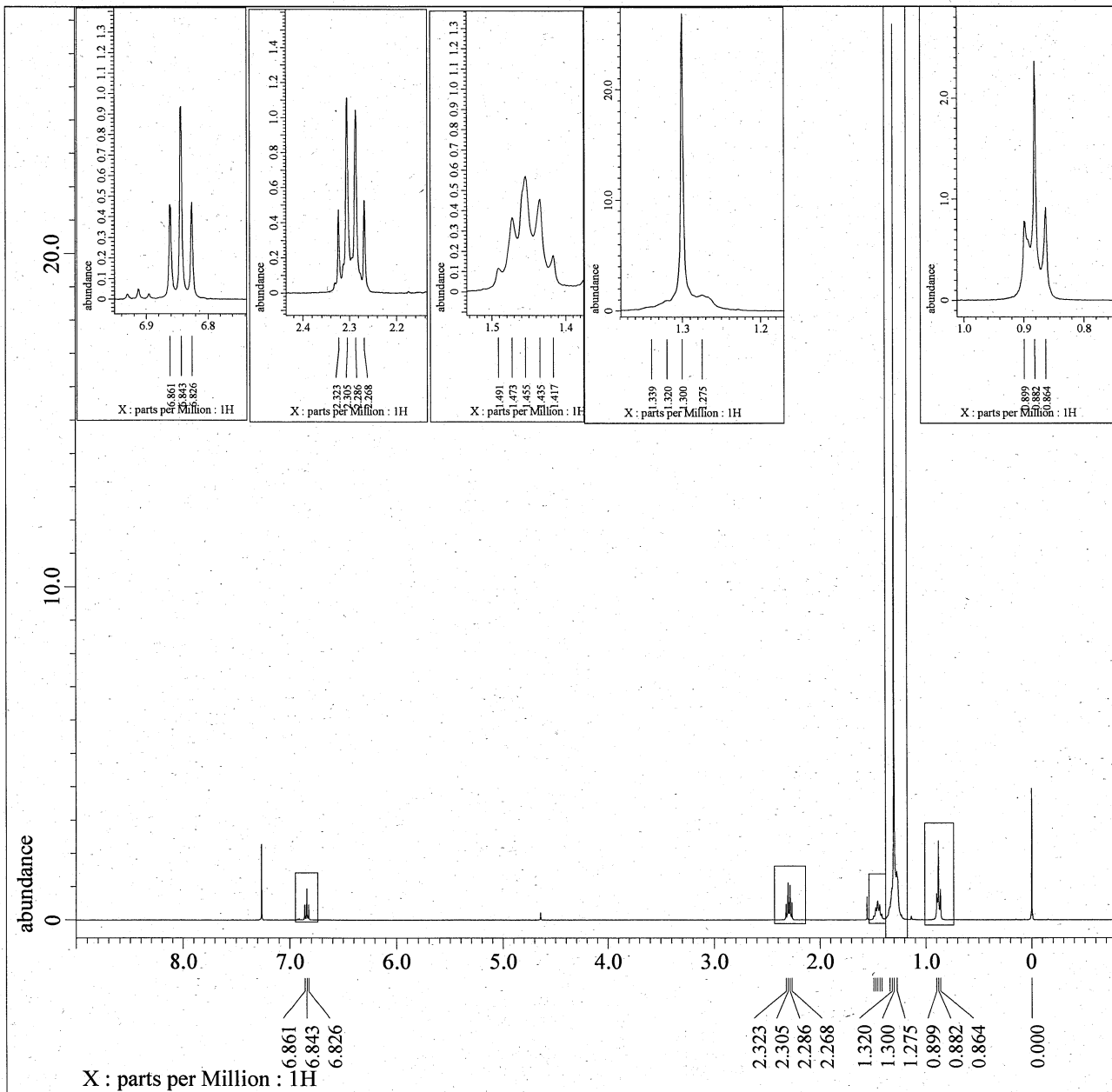
Filename = PYD-107-2C-4.jdf  
 Author = element  
 Experiment = single\_pulse\_dec  
 Sample\_Id = 107  
 Solvent = CHLOROFORM-D  
 Creation\_Time = 23-MAR-2018 20:10:31  
 Revision\_Time = 14-JUN-2018 22:14:13  
 Current\_Time = 14-JUN-2018 22:14:48

Comment = single pulse decoupl  
 Data\_Format = 1D COMPLEX  
 Dim\_Size = 26214  
 Dim\_Title = 13C  
 Dim\_Units = [ppm]  
 Dimensions = X  
 Site = ECS 400  
 Spectrometer = JNM-ECS400

Field Strength = 9.20197068[T] (390[M  
 X\_Acq\_Duration = 1.06430464[s]  
 X\_Domain = 13C  
 X\_Freq = 98.51479726[MHz]  
 X\_Offset = 100[ppm]  
 X\_Points = 32768  
 X\_Prescans = 4  
 X\_Resolution = 0.93958061[Hz]  
 X\_Sweep = 30.78817734[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 391.78655441[MHz]  
 Irr\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 256  
 Total\_Scans = 256

Relaxation\_Delay = 2[s]  
 Recvr\_Gain = 60  
 Temp\_Get = 19[dc]  
 X\_90\_Width = 9.11[us]  
 X\_Acq\_Time = 1.06430464[s]  
 X\_Angle = 30[deg]  
 X\_Atn = 4.9[dB]  
 X\_Pulse = 3.03666667[us]





---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 0.2[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

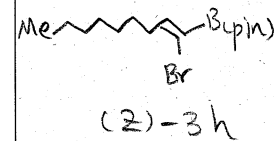
以下に由来: PYD-096H-2.jdf

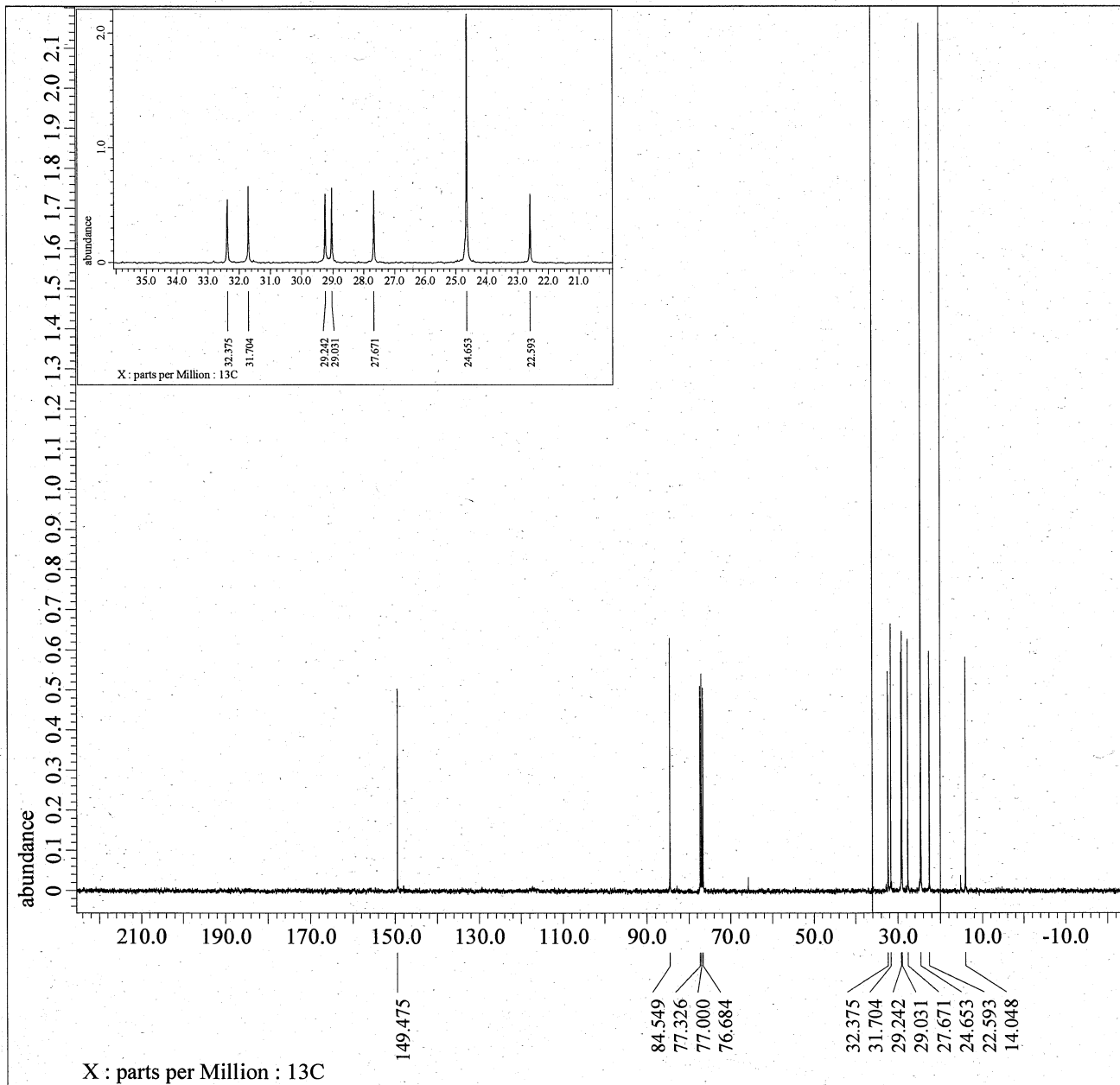
Filename = PYD-096H-5.jdf  
 Author = element  
 Experiment = single\_pulse.ex2  
 Sample Id = S#726310  
 Solvent = CHLOROFORM-D  
 Creation Time = 19-JAN-2018 18:51:55  
 Revision Time = 14-JUN-2018 22:17:52  
 Current Time = 14-JUN-2018 22:21:03

Comment = single\_pulse  
 Data Format = 1D COMPLEX  
 Dim Size = 13107  
 Dim Title = 1H  
 Dim Units = [ppm]  
 Dimensions = X  
 Site = ECS 400  
 Spectrometer = JNM-ECS400

Field Strength = 9.20197068[T] (390[M  
 X\_Acq\_Duration = 2.228224[s]  
 X\_Domain = 1H  
 X\_Freq = 391.78655441[MHz]  
 X\_Offset = 5[ppm]  
 X\_Points = 16384  
 X\_Prescans = 1  
 X\_Resolution = 0.44878791[Hz]  
 X\_Sweep = 7.35294118[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 391.78655441[MHz]  
 Irr\_Offset = 5[ppm]  
 Tri\_Domain = 1H  
 Tri\_Freq = 391.78655441[MHz]  
 Tri\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 8  
 Total\_Scans = 8

Relaxation\_Delay = 5[s]  
 Recvr\_Gain = 44  
 Temp\_Get = 20.6[dC]  
 X\_90\_Width = 11.04[us]  
 X\_Acq\_Time = 2.228224[s]





---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 2.0[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

以下に由来: : PYD-096C-2.jdf

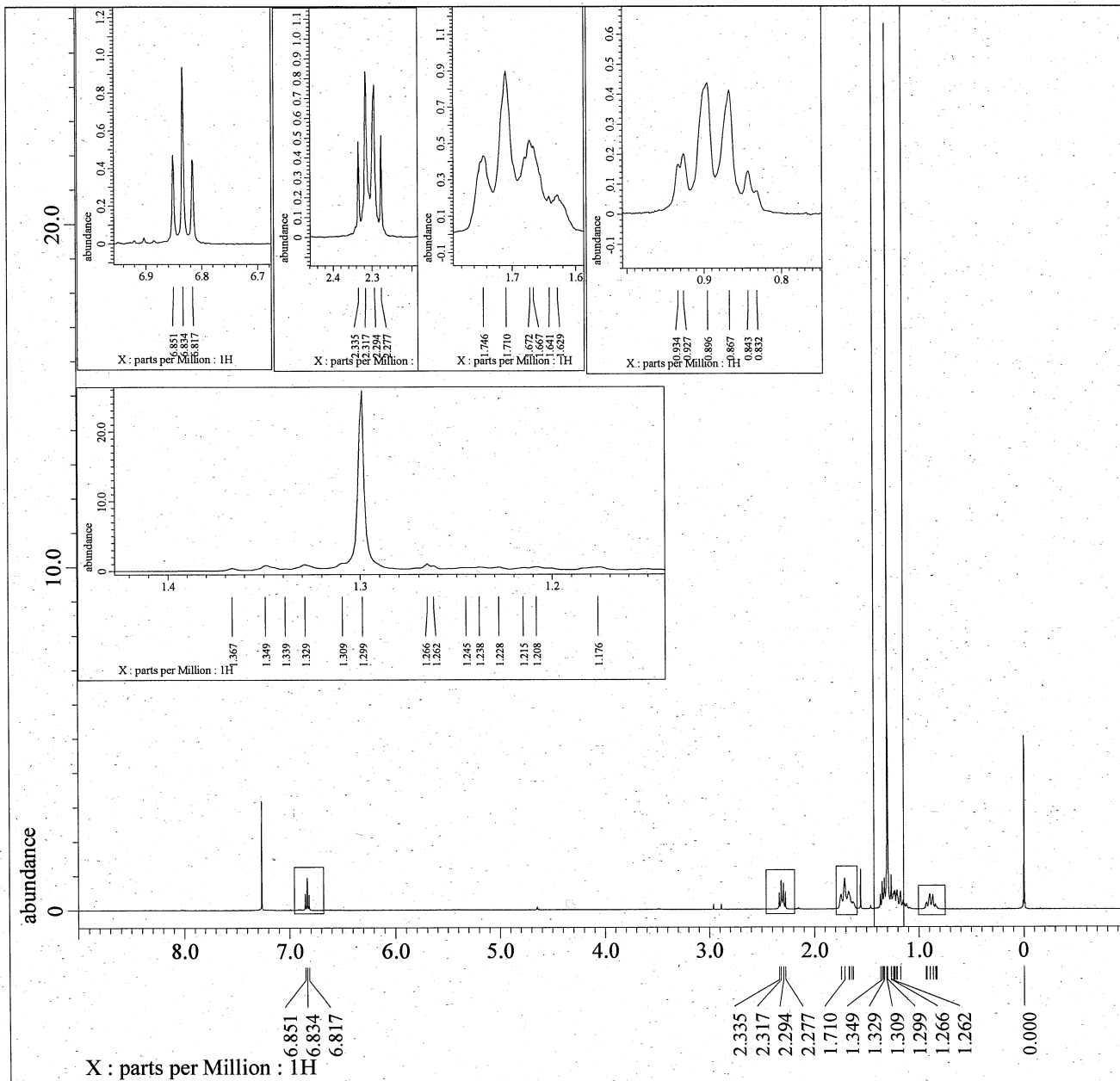
Filename = PYD-096C-5.jdf  
 Author = element  
 Experiment = single\_pulse\_dec  
 Sample\_Id = 096  
 Solvent = CHLOROFORM-D  
 Creation\_Time = 24-MAR-2018 16:25:19  
 Revision\_Time = 14-JUN-2018 22:23:05  
 Current\_Time = 14-JUN-2018 22:23:53

Comment = single pulse decoupl  
 Data\_Format = 1D COMPLEX  
 Dim\_Size = 26214  
 Dim\_Title = 13C  
 Dim\_Units = [ppm]  
 Dimensions = X  
 Site = ECX 400P  
 Spectrometer = DELTA2\_NMR

Field\_Strength = 9.2982153[T] (400[MH  
 X\_Acq\_Duration = 1.048576[s]  
 X\_Domain = 13C  
 X\_Freq = 99.54517646[MHz]  
 X\_Offset = 100[ppm]  
 X\_Points = 32768  
 X\_Prescans = 4  
 X\_Resolution = 0.95367432[Hz]  
 X\_Sweep = 31.25[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 395.88430144[MHz]  
 Irr\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 200  
 Total\_Scans = 200

Relaxation\_Delay = 2[s]  
 Recvr\_Gain = 54  
 Temp\_Get = 22.3[dC]  
 X\_90\_Width = 10.1[us]  
 X\_Acq\_Time = 1.048576[s]  
 X\_Angle = 30[deg]  
 X\_Atn = 3.4[dB]  
 X\_Pulse = 3.36666667[us]

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---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 0.2[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

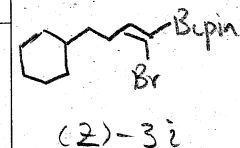
以下に由来: : PYD-115H-2. jdf

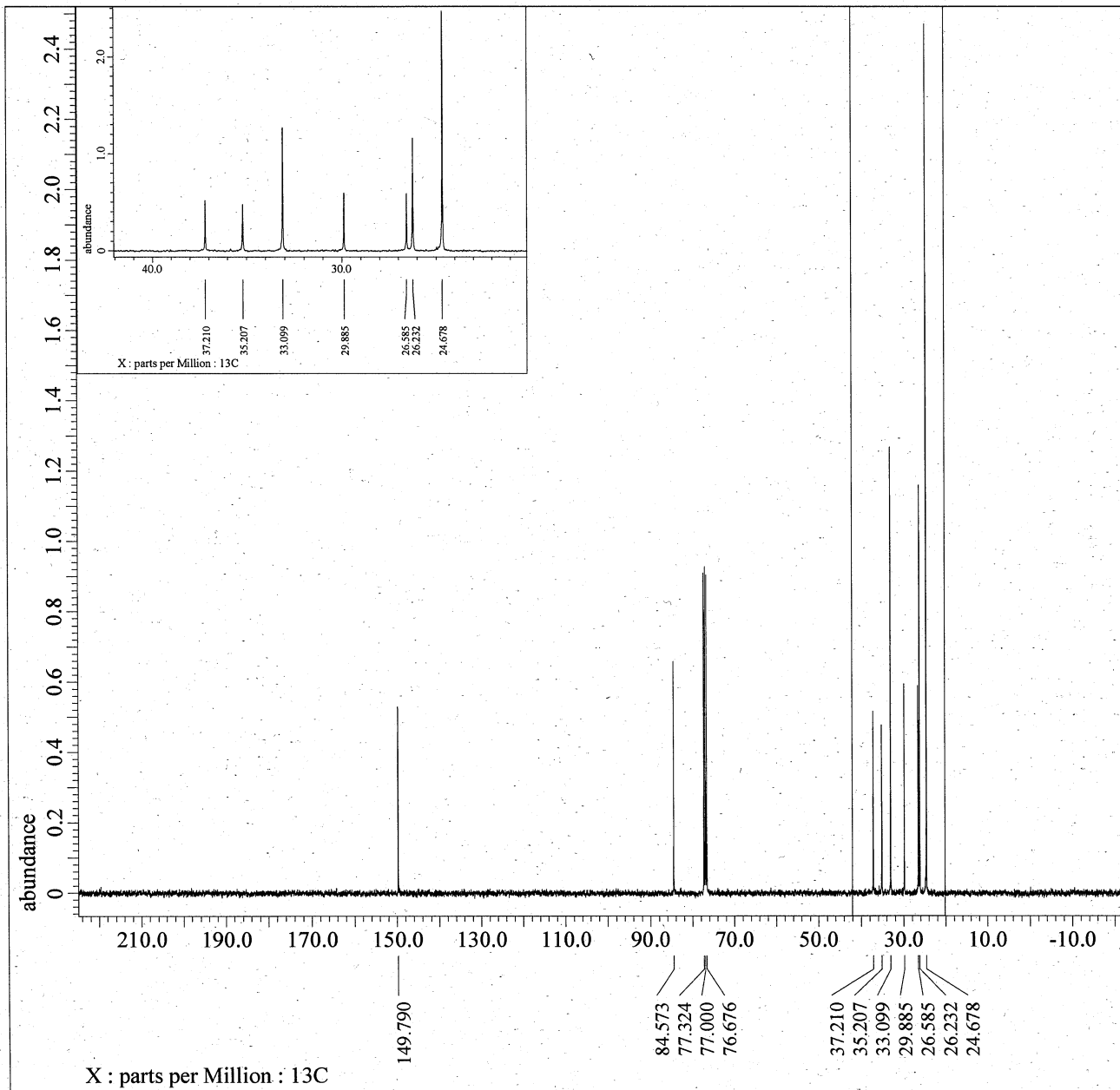
Filename = PYD-115H-5. jdf  
 Author = element  
 Experiment = single pulse.ex2  
 Sample Id = S#463452  
 Solvent = CHLOROFORM-D  
 Creation Time = 13-FEB-2018 11:30:06  
 Revision Time = 15-JUN-2018 09:13:09  
 Current Time = 15-JUN-2018 09:14:35

Comment = single pulse  
 Data Format = 1D COMPLEX  
 Dim Size = 13107  
 Dim Title = 1H  
 Dim Units = [ppm]  
 Dimensions = X  
 Site = ECS 400  
 Spectrometer = JNM-ECS400

Field Strength = 9.20197068[T] (390[M  
 X\_Acq\_Duration = 2.228224[s]  
 X\_Domain = 1H  
 X\_Freq = 391.78655441[MHz]  
 X\_Offset = 5[ppm]  
 X\_Points = 16384  
 X\_Prescans = 1  
 X\_Resolution = 0.44878791[Hz]  
 X\_Sweep = 7.35294118[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 391.78655441[MHz]  
 Irr\_Offset = 5[ppm]  
 Tri\_Domain = 1H  
 Tri\_Freq = 391.78655441[MHz]  
 Tri\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 8  
 Total\_Scans = 8

Relaxation\_Delay = 5[s]  
 Recvr\_Gain = 46  
 Temp\_Get = 19.4[dC]  
 X\_90\_Width = 11.04[us]  
 X\_Acq\_Time = 2.228224[s]





---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 2.0[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

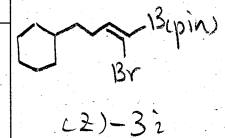
以下に由来: : PYD-115-2C-3.jdf

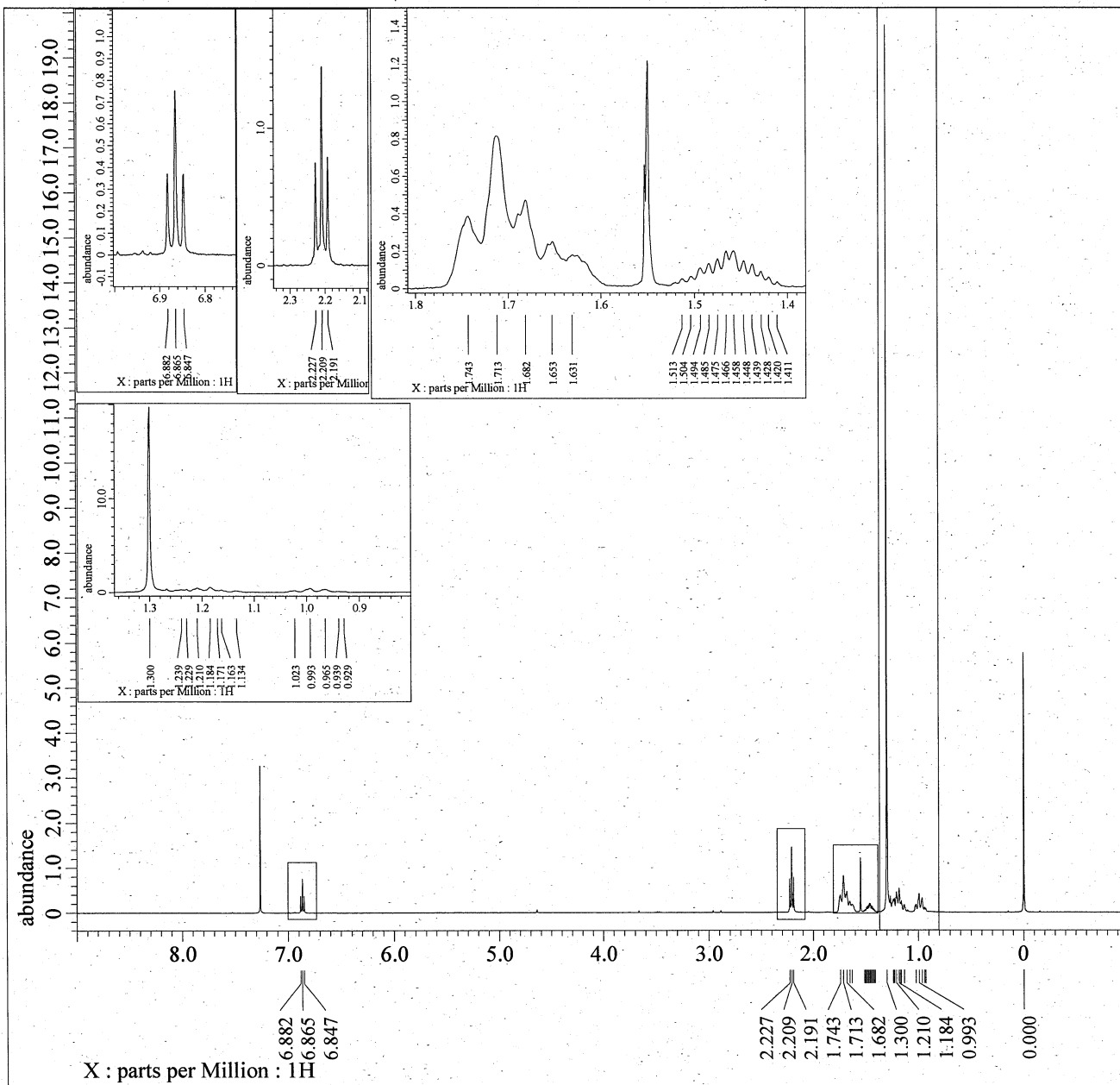
Filename = PYD-115-2C-6.jdf  
 Author = element  
 Experiment = single\_pulse\_dec  
 Sample\_Id = 115  
 Solvent = CHLOROFORM-D  
 Creation\_Time = 26-MAR-2018 12:55:45  
 Revision\_Time = 15-JUN-2018 09:16:50  
 Current\_Time = 15-JUN-2018 09:17:35

Comment = single pulse decoupl  
 Data\_Format = 1D COMPLEX  
 Dim\_Size = 26214  
 Dim\_Title = 13C  
 Dim\_Units = [ppm]  
 Dimensions = X  
 Site = ECS 400  
 Spectrometer = JNM-ECS400

Field\_Strength = 9.20197068[T] (390[M  
 X\_Acq\_Duration = 1.06430464[s]  
 X\_Domain = 13C  
 X\_Freq = 98.51479726[MHz]  
 X\_Offset = 100[ppm]  
 X\_Points = 32768  
 X\_Prescans = 4  
 X\_Resolution = 0.93958061[Hz]  
 X\_Sweep = 30.78817734[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 391.78655441[MHz]  
 Irr\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 256  
 Total\_Scans = 256

Relaxation\_Delay = 2[s]  
 Recvr\_Gain = 60  
 Temp\_Get = 19.2[dC]  
 X\_90\_Width = 9.11[us]  
 X\_Acq\_Time = 1.06430464[s]  
 X\_Angle = 30[deg]  
 X\_Atn = 4.9[dB]  
 X\_Pulse = 3.03666667[us]





---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 0.2[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

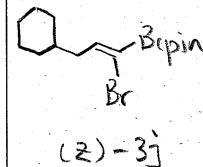
以下に由来: : PYD-112H-2.jdf

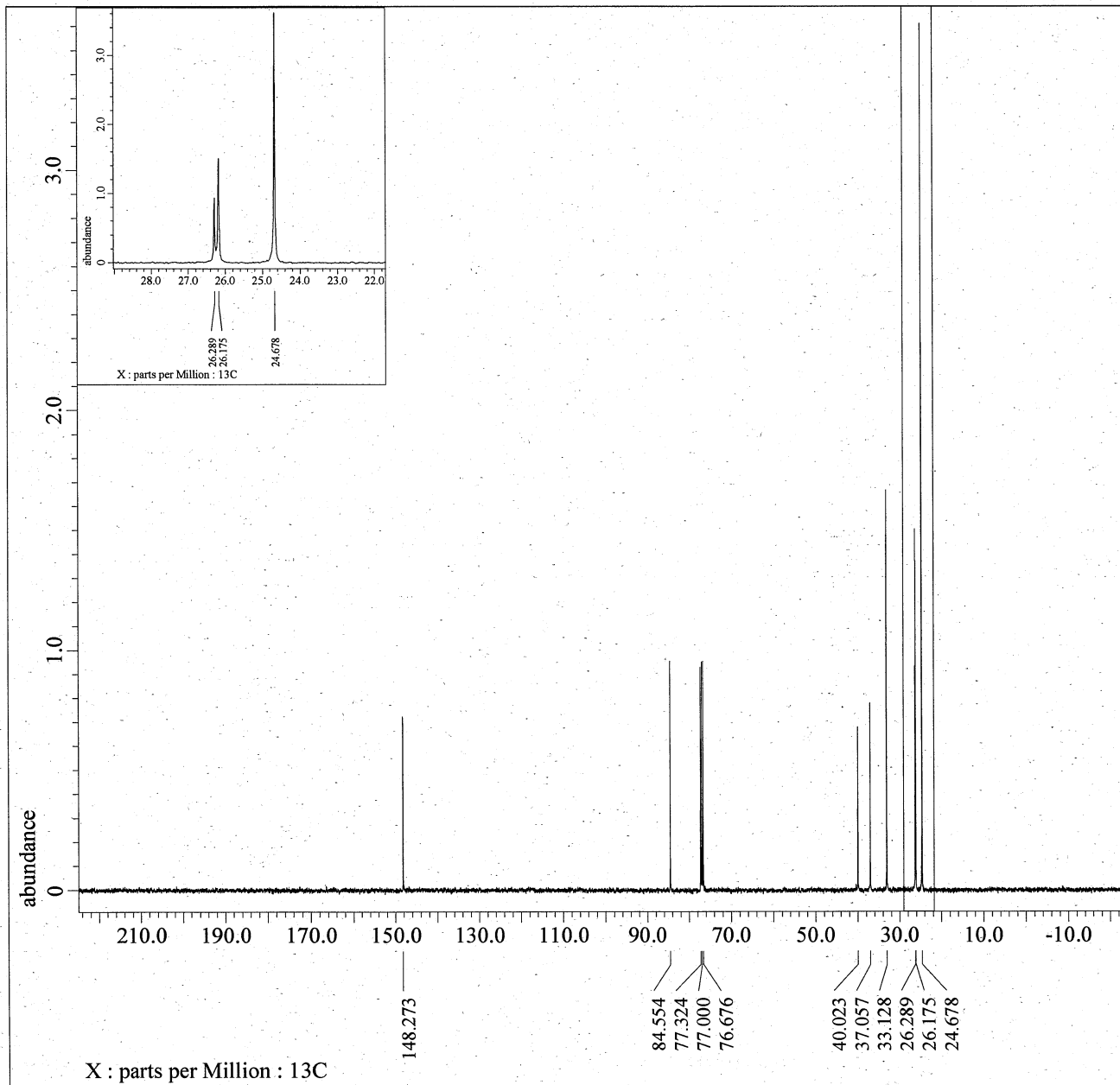
Filename = PYD-112H-5.jdf  
 Author = element  
 Experiment = single pulse.ex2  
 Sample Id = S#721047  
 Solvent = CHLOROFORM-D  
 Creation Time = 9-FEB-2018 18:39:58  
 Revision Time = 15-JUN-2018 09:23:58  
 Current Time = 15-JUN-2018 09:27:46

Comment = single pulse  
 Data Format = 1D COMPLEX  
 Dim Size = 13107  
 Dim Title = 1H  
 Dim Units = [ppm]  
 Dimensions = X  
 Site = ECS 400  
 Spectrometer = JNM-ECS400

Field Strength = 9.20197068[T] (390[M]  
 X\_Acq\_Duration = 2.228224[s]  
 X\_Domain = 1H  
 X\_Freq = 391.78655441 [MHz]  
 X\_Offset = 5[ppm]  
 X\_Points = 16384  
 X\_Prescans = 1  
 X\_Resolution = 0.44878791 [Hz]  
 X\_Sweep = 7.35294118 [kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 391.78655441 [MHz]  
 Irr\_Offset = 5[ppm]  
 Tri\_Domain = 1H  
 Tri\_Freq = 391.78655441 [MHz]  
 Tri\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 8  
 Total\_Scans = 8

Relaxation\_Delay = 5[s]  
 Recvr\_Gain = 48  
 Temp\_Get = 20.4 [dC]  
 X\_90\_Width = 11.04 [us]  
 X\_Acq\_Time = 2.228224 [s]





---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 2.0[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

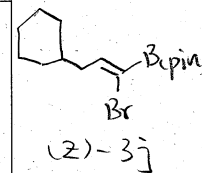
以下に由来: : PYD-112\_13C-2.jdf

Filename = PYD-112\_13C-4.jdf  
 Author = element  
 Experiment = single\_pulse\_dec  
 Sample\_Id = 112  
 Solvent = CHLOROFORM-D  
 Creation\_Time = 2-MAR-2018 11:52:28  
 Revision\_Time = 15-JUN-2018 09:29:44  
 Current\_Time = 15-JUN-2018 09:30:25

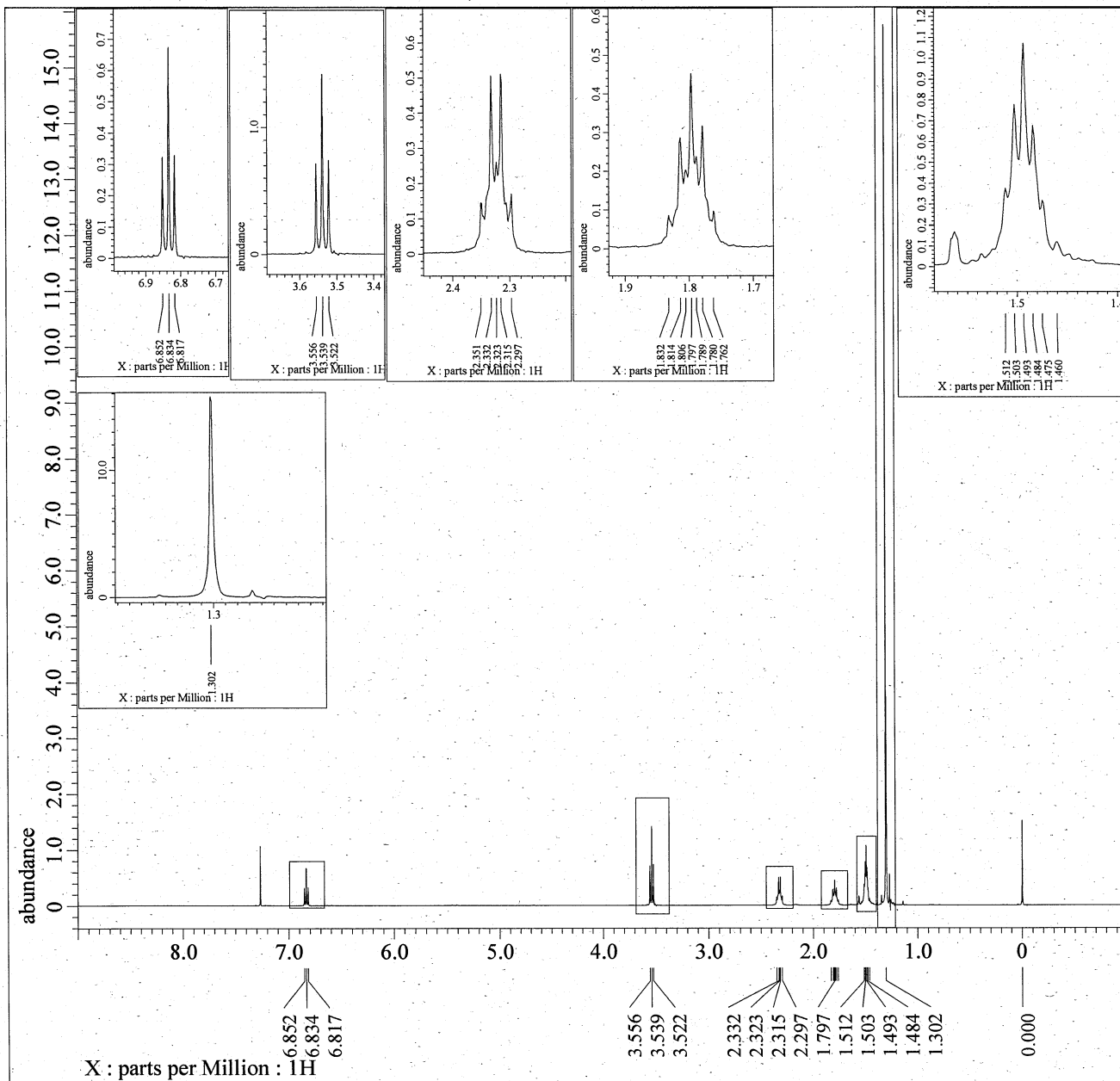
Comment = single pulse decoupl  
 Data\_Format = 1D\_COMPLEX  
 Dim\_Size = 26214  
 Dim\_Title = 13C  
 Dim\_Units = [ppm]  
 Dimensions = X  
 Site = ECS 400  
 Spectrometer = JNM-ECS400

Field Strength = 9.20197068[T] (390[M  
 X\_Acq\_Duration = 1.06430464[s]  
 X\_Domain = 13C  
 X\_Freq = 98.51479726[MHz]  
 X\_Offset = 100[ppm]  
 X\_Points = 32768  
 X\_Prescans = 4  
 X\_Resolution = 0.93958061[Hz]  
 X\_Sweep = 30.78817734[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 391.78655441[MHz]  
 Irr\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 200  
 Total\_Scans = 200

Relaxation\_Delay = 2[s]  
 Recvr\_Gain = 60  
 Temp\_Get = 20.1[dC]  
 X\_90\_Width = 9.11[us]  
 X\_Acq\_Time = 1.06430464[s]  
 X\_Angle = 30[deg]  
 X\_Atn = 4.9[dB]  
 X\_Pulse = 3.03666667[us]







---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 0.2[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

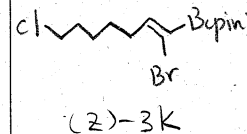
以下に由来: : PYD-118H-2.jdf

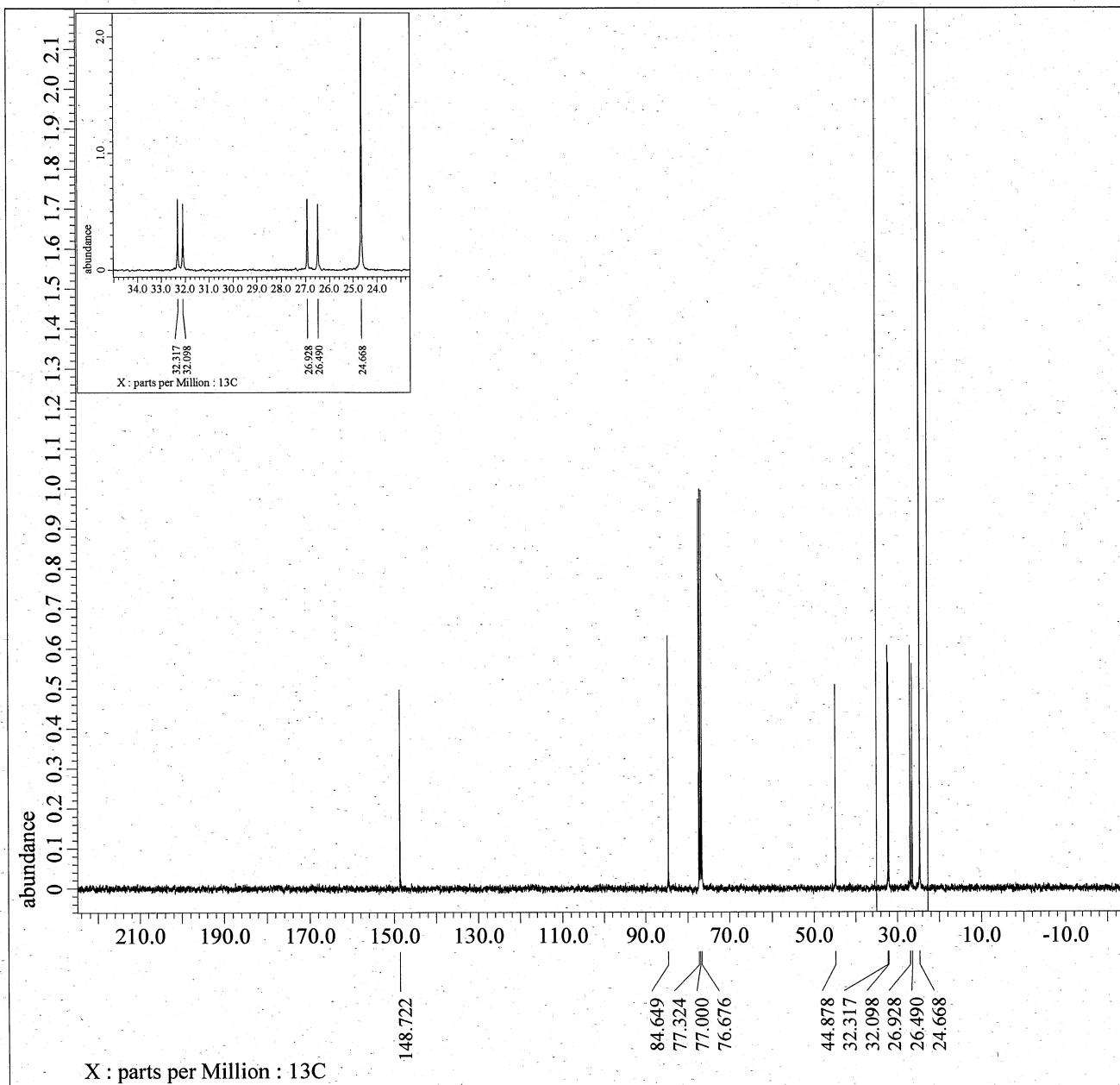
Filename = PYD-118H-5.jdf  
 Author = element  
 Experiment = single pulse.ex2  
 Sample Id = S#633774  
 Solvent = CHLOROFORM-D  
 Creation Time = 19-FEB-2018 17:15:14  
 Revision Time = 15-JUN-2018 09:34:28  
 Current Time = 15-JUN-2018 09:37:51

Comment = single pulse  
 Data Format = 1D COMPLEX  
 Dim Size = 13107  
 Dim Title = 1H  
 Dim Units = [ppm]  
 Dimensions = X  
 Site = ECX 400P  
 Spectrometer = DELTA2\_NMR

Field Strength = 9.2982153[T] (400[MHz])  
 X\_Acq\_Duration = 2.20725248[s]  
 X\_Domain = 1H  
 X\_Freq = 395.88430144[MHz]  
 X\_Offset = 5[ppm]  
 X\_Points = 16384  
 X\_Prescans = 1  
 X\_Resolution = 0.45305193[Hz]  
 X\_Sweep = 7.42280285[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 395.88430144[MHz]  
 Irr\_Offset = 5[ppm]  
 Tri\_Domain = 1H  
 Tri\_Freq = 395.88430144[MHz]  
 Tri\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 8  
 Total\_Scans = 8

Relaxation\_Delay = 5[s]  
 Recvr\_Gain = 36  
 Temp\_Get = 22.1[dC]  
 X\_90\_Width = 11.5[us]  
 X\_Acq\_Time = 2.20725248[s]





---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 2.0[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

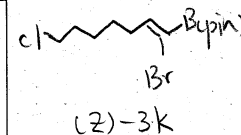
以下に由来: : PYD-118-2C-2.jdf

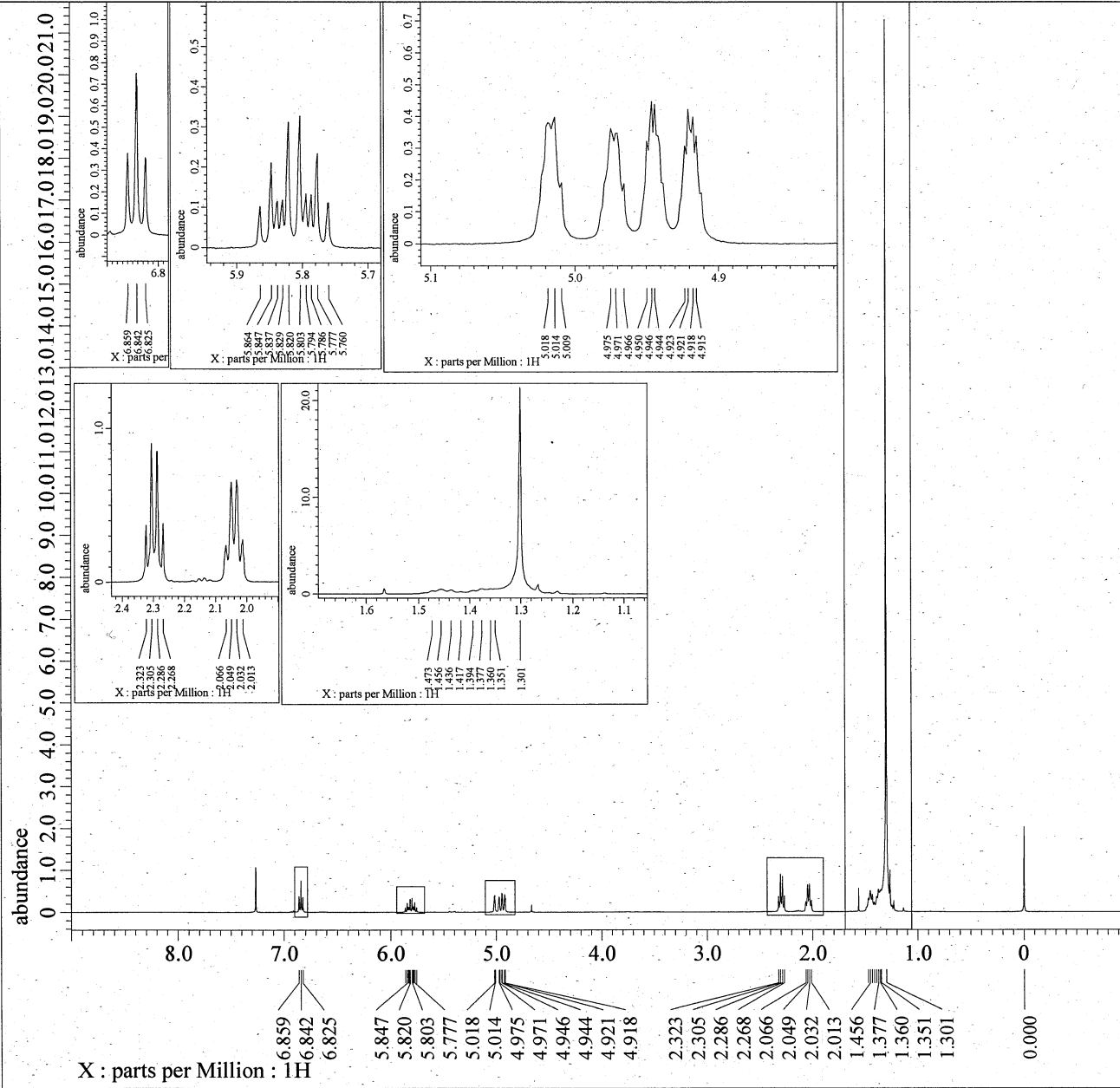
Filename = PYD-118-2C-4.jdf  
 Author = element  
 Experiment = single\_pulse\_dec  
 Sample Id = 118  
 Solvent = CHLOROFORM-D  
 Creation Time = 25-MAR-2018 16:07:48  
 Revision Time = 15-JUN-2018 09:39:51  
 Current Time = 15-JUN-2018 09:40:29

Comment = single pulse decoupl  
 Data Format = 1D COMPLEX  
 Dim Size = 26214  
 Dim Title = 13C  
 Dim Units = [ppm]  
 Dimensions = X  
 Site = ECS 400  
 Spectrometer = JNM-ECS400

Field Strength = 9.20197068[T] (390[M  
 X\_Acq\_Duration = 1.06430464[s]  
 X\_Domain = 13C  
 X\_Freq = 98.51479726[MHz]  
 X\_Offset = 100[ppm]  
 X\_Points = 32768  
 X\_Prescans = 4  
 X\_Resolution = 0.93958061[Hz]  
 X\_Sweep = 30.78817734[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 391.78655441[MHz]  
 Irr\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 256  
 Total\_Scans = 256

Relaxation\_Delay = 2[s]  
 Recvr\_Gain = 60  
 Temp\_Get = 20[dC]  
 X\_90\_Width = 9.11[us]  
 X\_Acq\_Time = 1.06430464[s]  
 X\_Angle = 30[deg]  
 X\_Atn = 4.9[dB]  
 X\_Pulse = 3.03666667[us]





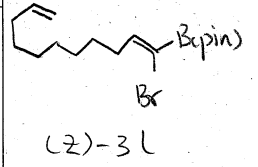
---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 0.2[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm  
 以下に由来: : PYD-121H-2.jdf

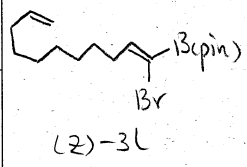
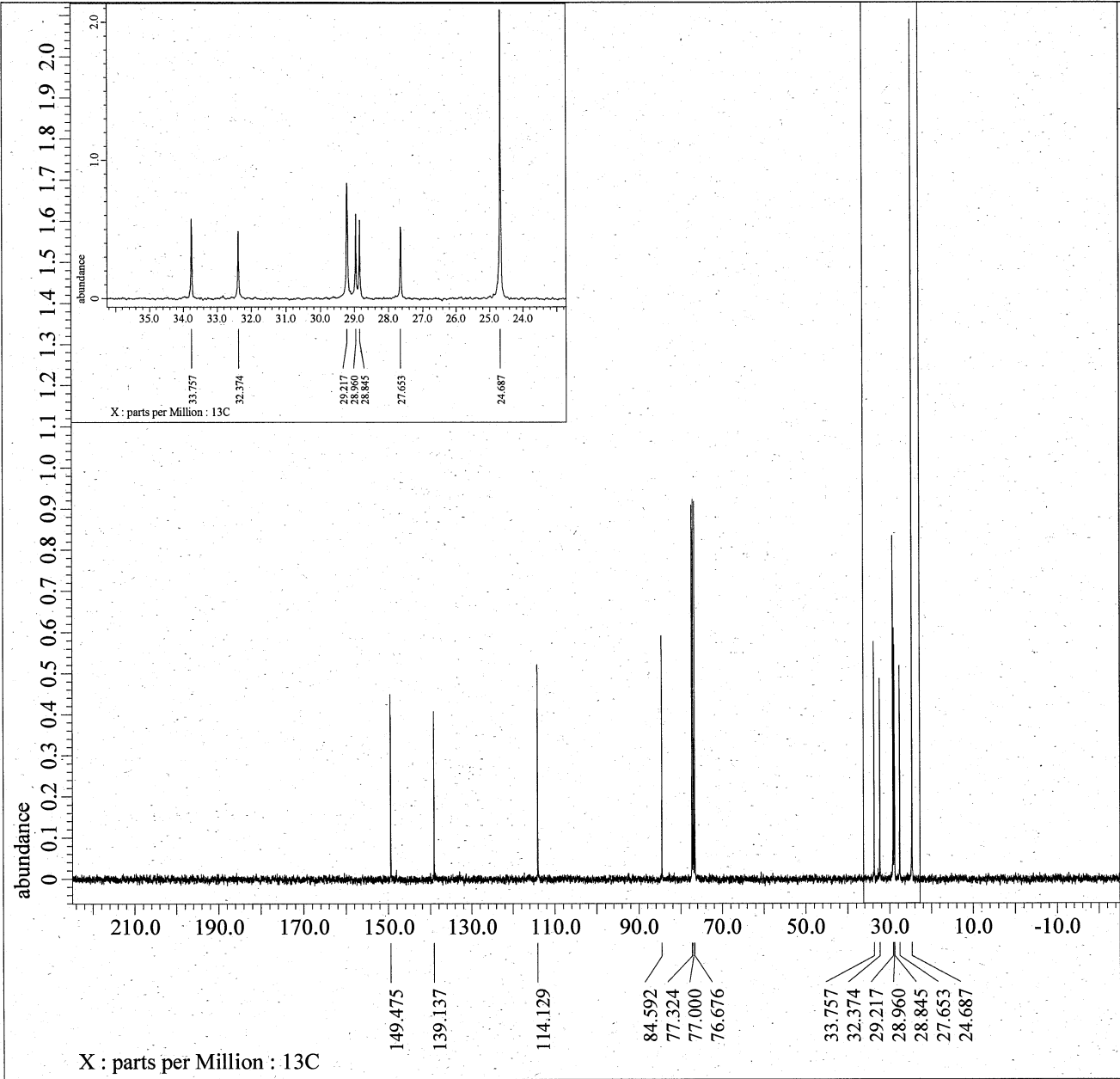
Filename = PYD-121H-5.jdf  
 Author = element  
 Experiment = single\_pulse.ex2  
 Sample Id = S#762215  
 Solvent = CHLOROFORM-D  
 Creation Time = 20-FEB-2018 19:47:16  
 Revision Time = 15-JUN-2018 09:44:24  
 Current Time = 15-JUN-2018 09:47:29

Comment = single\_pulse  
 Data Format = 1D\_COMPLEX  
 Dim Size = 13107  
 Dim Title = 1H  
 Dim Units = [ppm]  
 Dimensions = X  
 Site = ECS 400  
 Spectrometer = JNM-ECS400

Field Strength = 9.20197068[T] (390[M]  
 X\_Acq\_Duration = 2.228224[s]  
 X\_Domain = 1H  
 X\_Freq = 391.78655441[MHz]  
 X\_Offset = 5[ppm]  
 X\_Points = 16384  
 X\_Prescans = 1  
 X\_Resolution = 0.44878791[Hz]  
 X\_Sweep = 7.35294118[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 391.78655441[MHz]  
 Irr\_Offset = 5[ppm]  
 Tri\_Domain = 1H  
 Tri\_Freq = 391.78655441[MHz]  
 Tri\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 8  
 Total\_Scans = 8

Relaxation\_Delay = 5[s]  
 Recvr\_Gain = 40  
 Temp\_Get = 19.2[dC]  
 X\_90\_Width = 11.04[us]  
 X\_Acq\_Time = 2.228224[s]





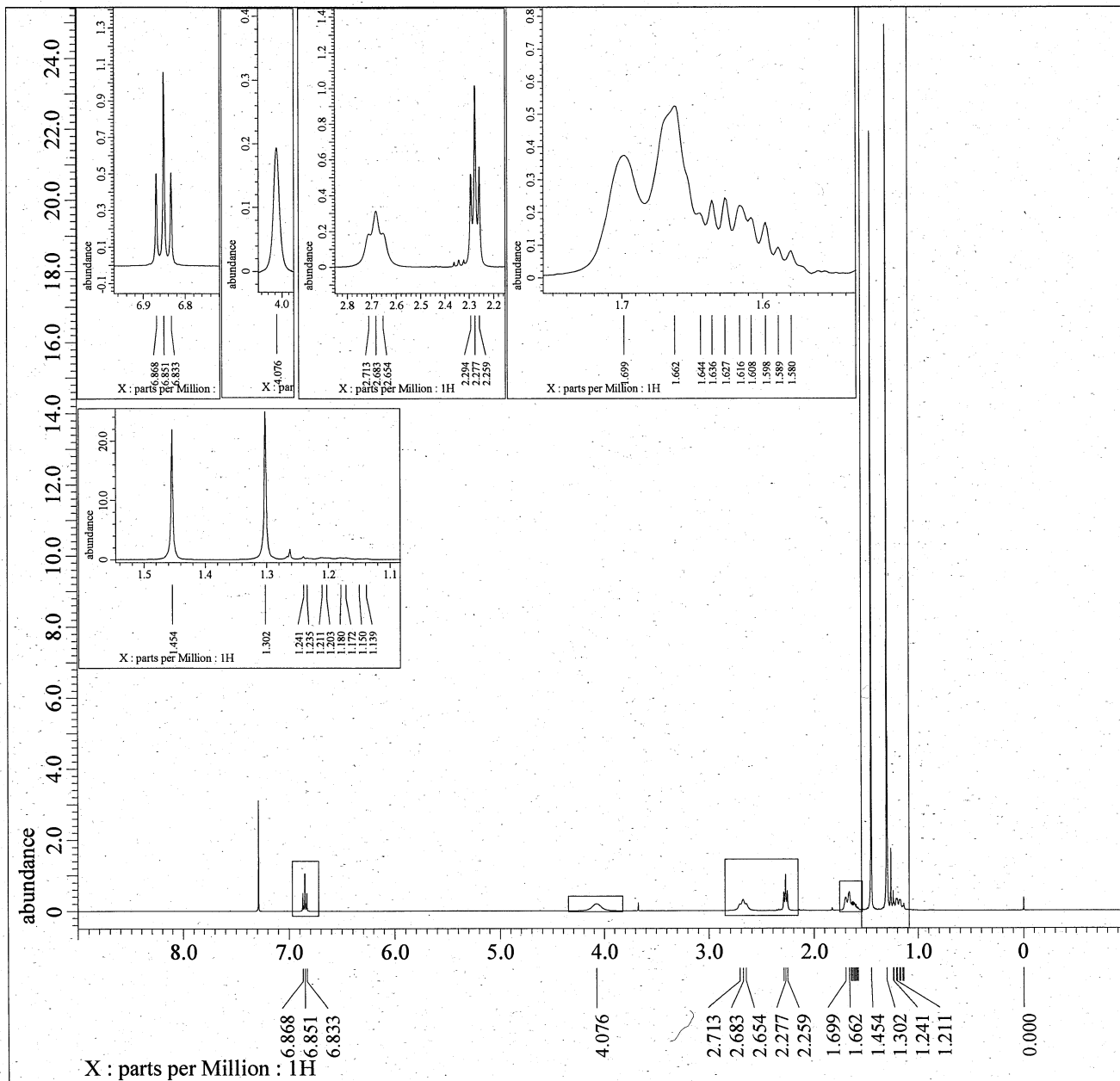
---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 2.0[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm  
 以下に由来: : PYD-121-2C-2.jdf

Filename = PYD-121-2C-4.jdf  
 Author = element  
 Experiment = single\_pulse\_dec  
 Sample Id = 121  
 Solvent = CHLOROFORM-D  
 Creation Time = 26-MAR-2018 10:19:30  
 Revision Time = 15-JUN-2018 09:49:27  
 Current Time = 15-JUN-2018 09:50:04

Comment = single pulse decoupl  
 Data Format = 1D COMPLEX  
 Dim Size = 26214  
 Dim Title = 13C  
 Dim Units = [ppm]  
 Dimensions = X  
 Site = ECS 400  
 Spectrometer = JNM-ECS400

Field Strength = 9.20197068[T] (390[M  
 X\_Acq\_Duration = 1.06430464[s]  
 X\_Domain = 13C  
 X\_Freq = 98.51479726[MHz]  
 X\_Offset = 100[ppm]  
 X\_Points = 32768  
 X\_Prescans = 4  
 X\_Resolution = 0.93958061[Hz]  
 X\_Sweep = 30.78817734[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 391.78655441[MHz]  
 Irr\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 200  
 Total Scans = 200

Relaxation\_Delay = 2[s]  
 Recvr\_Gain = 60  
 Temp\_Get = 19.4[dC]  
 X\_90\_Width = 9.11[us]  
 X\_Acq\_Time = 1.06430464[s]  
 X\_Angle = 30[deg]  
 X\_Atn = 4.9[dB]  
 X\_Pulse = 3.03666667[us]



```

---- PROCESSING PARAMETERS ----
dc_balance( 0, FALSE )
sexp( 0.2[Hz], 0.0[s] )
trapezoid3( 0[%], 80[%], 100[%] )
zerofill( 1 )
fft( 1, TRUE, TRUE )
machinephase
ppm
  
```

以下に由来: : PYD-137-5H-2.jdf

```

Filename      = PYD-137-5H-5.jdf
Author        = element
Experiment     = single_pulse.ex2
Sample Id     = 137
Solvent       = CHLOROFORM-D
Creation Time  = 26-MAR-2018 19:17:56
Revision Time  = 15-JUN-2018 09:54:38
Current Time   = 15-JUN-2018 09:59:03
  
```

```

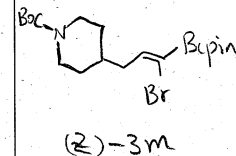
Comment       = single_pulse
Data Format    = 1D_COMPLEX
Dim Size      = 13107
Dim Title     = 1H
Dim Units     = [ppm]
Dimensions    = X
Site          = ECS 400
Spectrometer  = JNM-ECS400
  
```

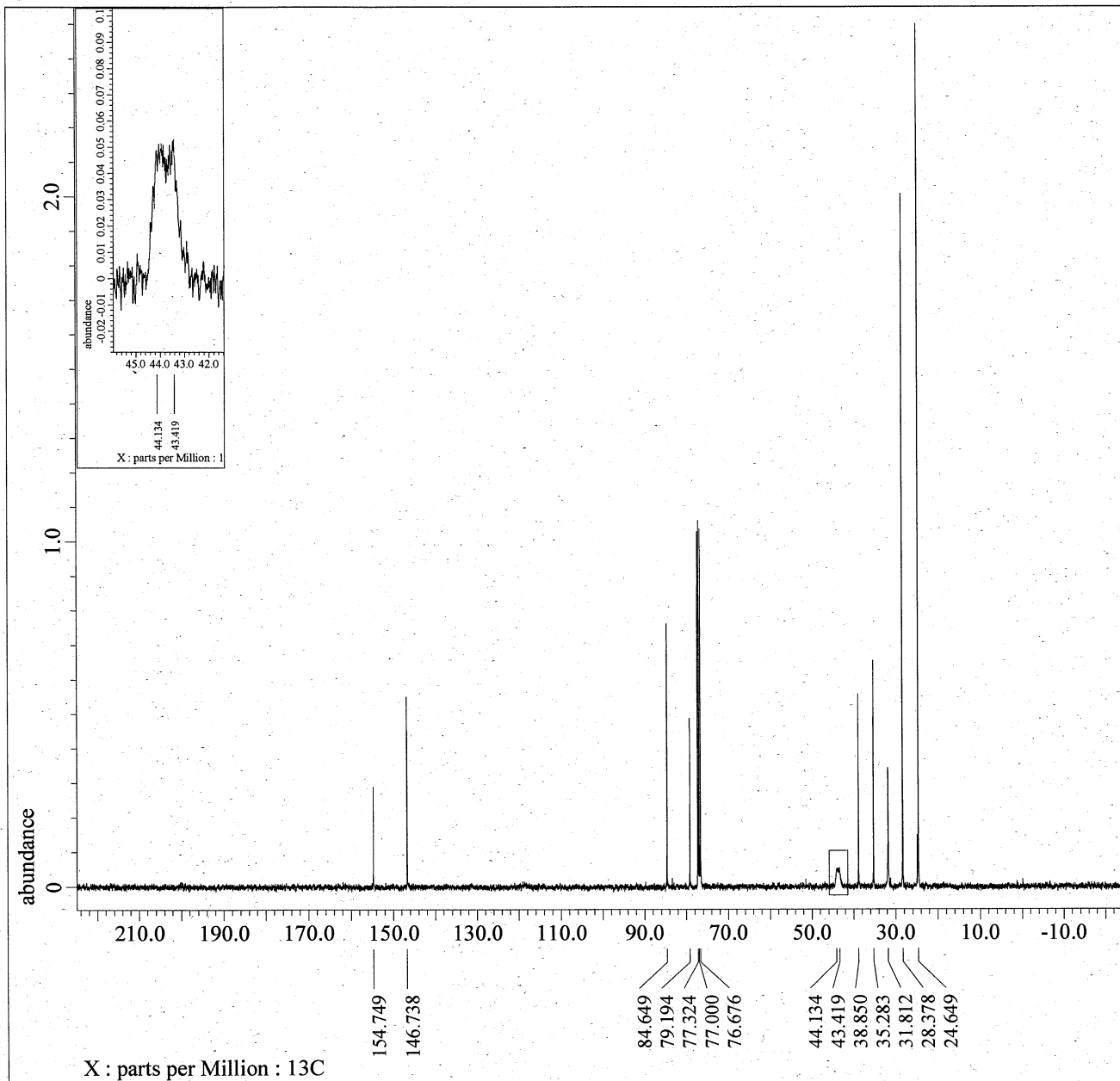
```

Field Strength = 9.20197068[T] (390[M
X_Acq_Duration = 2.228224[s]
X_Domain       = 1H
X_Freq         = 391.78655441[MHz]
X_Offset       = 5[ppm]
X_Points       = 16384
X_Prescans     = 1
X_Resolution   = 0.44878791[Hz]
X_Sweep        = 7.35294118[kHz]
Irr_Domain     = 1H
Irr_Freq       = 391.78655441[MHz]
Irr_Offset     = 5[ppm]
Tri_Domain     = 1H
Tri_Freq       = 391.78655441[MHz]
Tri_Offset     = 5[ppm]
Clipped        = FALSE
Scans          = 8
Total_Scans    = 8
  
```

```

Relaxation_Delay = 5[s]
Recvr_Gain       = 26
Temp_Get         = 19.2[dC]
X_90_Width      = 11.04[us]
X_Acq_Time       = 2.228224[s]
  
```





---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 2.0[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

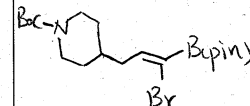
以下に由来: : PYD-137-2C-2.jdf

Filename = PYD-137-2C-5.jdf  
 Author = element  
 Experiment = single\_pulse\_dec  
 Sample\_Id = 137  
 Solvent = CHLOROFORM-D  
 Creation\_Time = 26-MAR-2018 19:32:21  
 Revision\_Time = 15-JUN-2018 10:04:29  
 Current\_Time = 15-JUN-2018 10:05:36

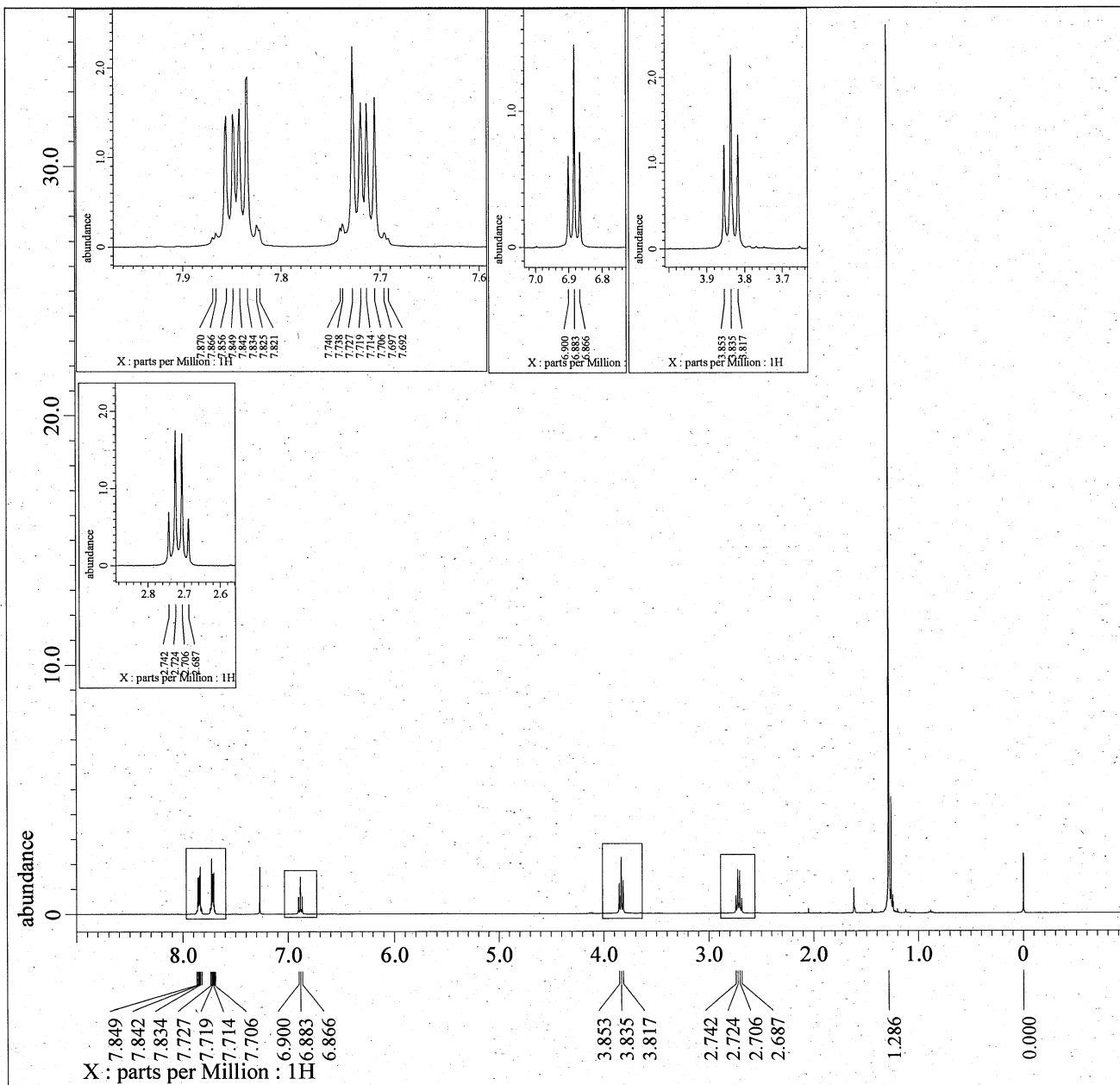
Comment = single pulse decoupl  
 Data\_Format = 1D\_COMPLEX  
 Dim\_Size = 26214  
 Dim\_Title = 13C  
 Dim\_Units = [ppm]  
 Dimensions = X  
 Site = ECS 400  
 Spectrometer = JNM-ECS400

Field\_Strength = 9.20197068[T] (390[M  
 X\_Acq\_Duration = 1.06430464[s]  
 X\_Domain = 13C  
 X\_Freq = 98.51479726[MHz]  
 X\_Offset = 100[ppm]  
 X\_Points = 32768  
 X\_Prescans = 4  
 X\_Resolution = 0.93958061[Hz]  
 X\_Sweep = 30.78817734[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 391.78655441[MHz]  
 Irr\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 256  
 Total\_Scans = 256

Relaxation\_Delay = 2[s]  
 Recvr\_Gain = 60  
 Temp\_Get = 18.4[dC]  
 X\_90\_Width = 9.11[us]  
 X\_Acq\_Time = 1.06430464[s]  
 X\_Angle = 30[deg]  
 X\_Atn = 4.9[dB]  
 X\_Pulse = 3.03666667[us]



(Z)-3m



---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 0.2[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

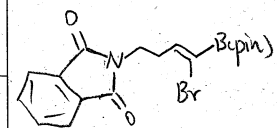
以下に由来: : PYD-134-2H-2.jdf

Filename = PYD-134-2H-5.jdf  
 Author = element  
 Experiment = single pulse.ex2  
 Sample Id = S#630174  
 Solvent = CHLOROFORM-D  
 Creation Time = 24-MAR-2018 16:02:40  
 Revision Time = 15-JUN-2018 10:09:29  
 Current Time = 15-JUN-2018 10:12:17

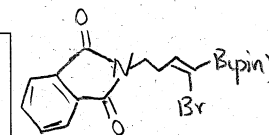
Comment = single pulse  
 Data Format = 1D COMPLEX  
 Dim Size = 13107  
 Dim Title = 1H  
 Dim Units = [ppm]  
 Dimensions = X  
 Site = ECS 400  
 Spectrometer = JNM-ECS400

Field Strength = 9.20197068[T] (390[M]  
 X\_Acq\_Duration = 2.228224[s]  
 X\_Domain = 1H  
 X\_Freq = 391.78655441[MHz]  
 X\_Offset = 5[ppm]  
 X\_Points = 16384  
 X\_Prescans = 1  
 X\_Resolution = 0.44878791[Hz]  
 X\_Sweep = 7.35294118[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 391.78655441[MHz]  
 Irr\_Offset = 5[ppm]  
 Tri\_Domain = 1H  
 Tri\_Freq = 391.78655441[MHz]  
 Tri\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 8  
 Total\_Scans = 8

Relaxation\_Delay = 5[s]  
 Recvr\_Gain = 42  
 Temp\_Get = 18.8[dC]  
 X\_90\_Width = 11.04[us]  
 X\_Acq\_Time = 2.228224[s]



(Z)-3N



(Z)-3n



```

---- PROCESSING PARAMETERS ----
dc_balance( 0, FALSE )
sexp( 2.0[Hz], 0.0[s] )
trapezoid3( 0[%], 80[%], 100[%] )
zerofill( 1 )
fft( 1, TRUE, TRUE )
machinephase
ppm
  
```

以下に由来: : PYD-134C-2.jdf

```

Filename      = PYD-134C-5.jdf
Author        = element
Experiment     = single_pulse_dec
Sample_Id     = 134
Solvent       = CHLOROFORM-D
Creation_Time  = 24-MAR-2018 16:24:41
Revision_Time  = 15-JUN-2018 10:15:20
Current_Time   = 15-JUN-2018 10:16:11
  
```

```

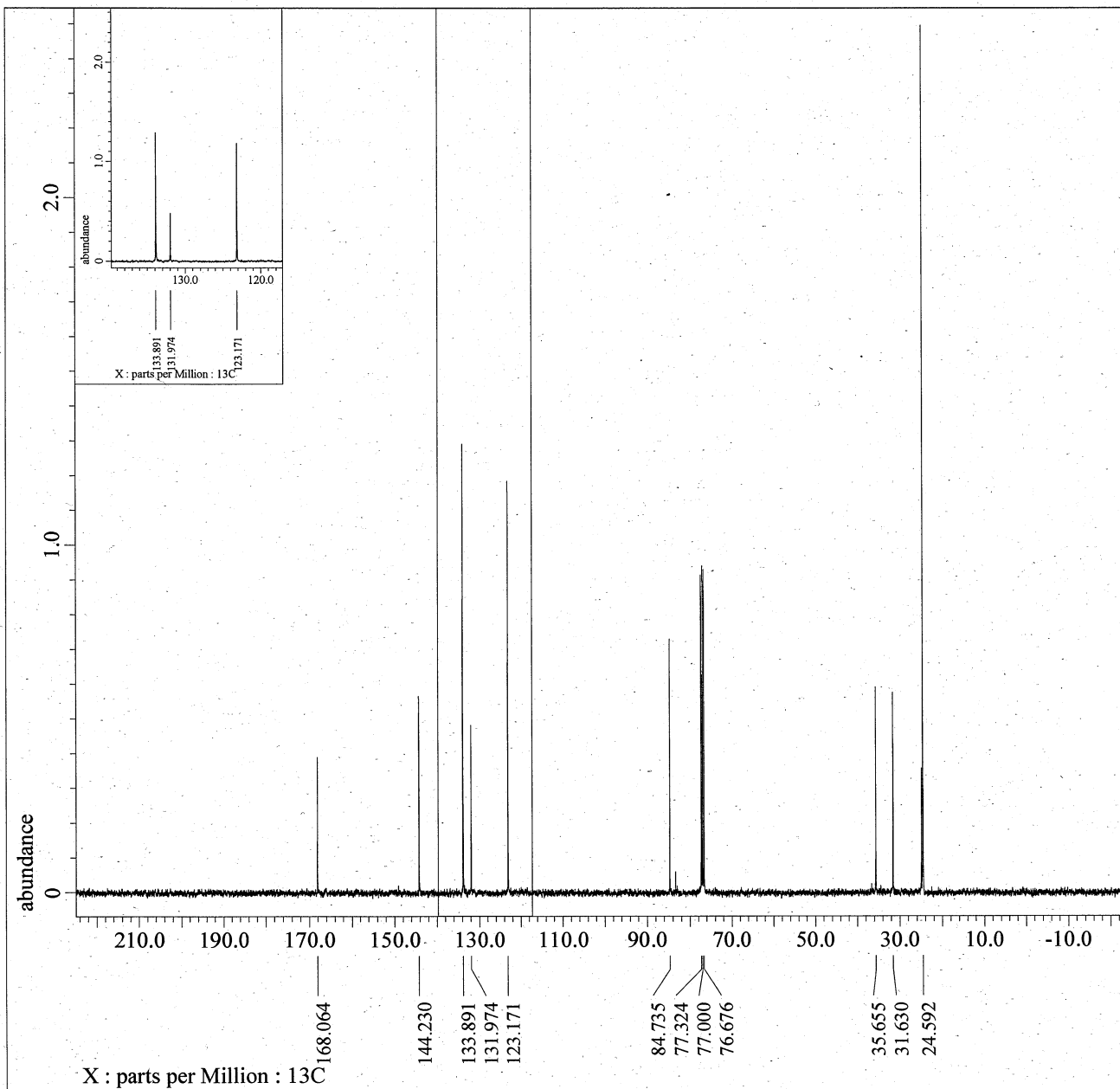
Comment       = single pulse decoupl
Data_Format   = 1D COMPLEX
Dim_Size      = 26214
Dim_Title     = 13C
Dim_Units     = [ppm]
Dimensions    = X
Site          = ECS 400
Spectrometer  = JNM-ECS400
  
```

```

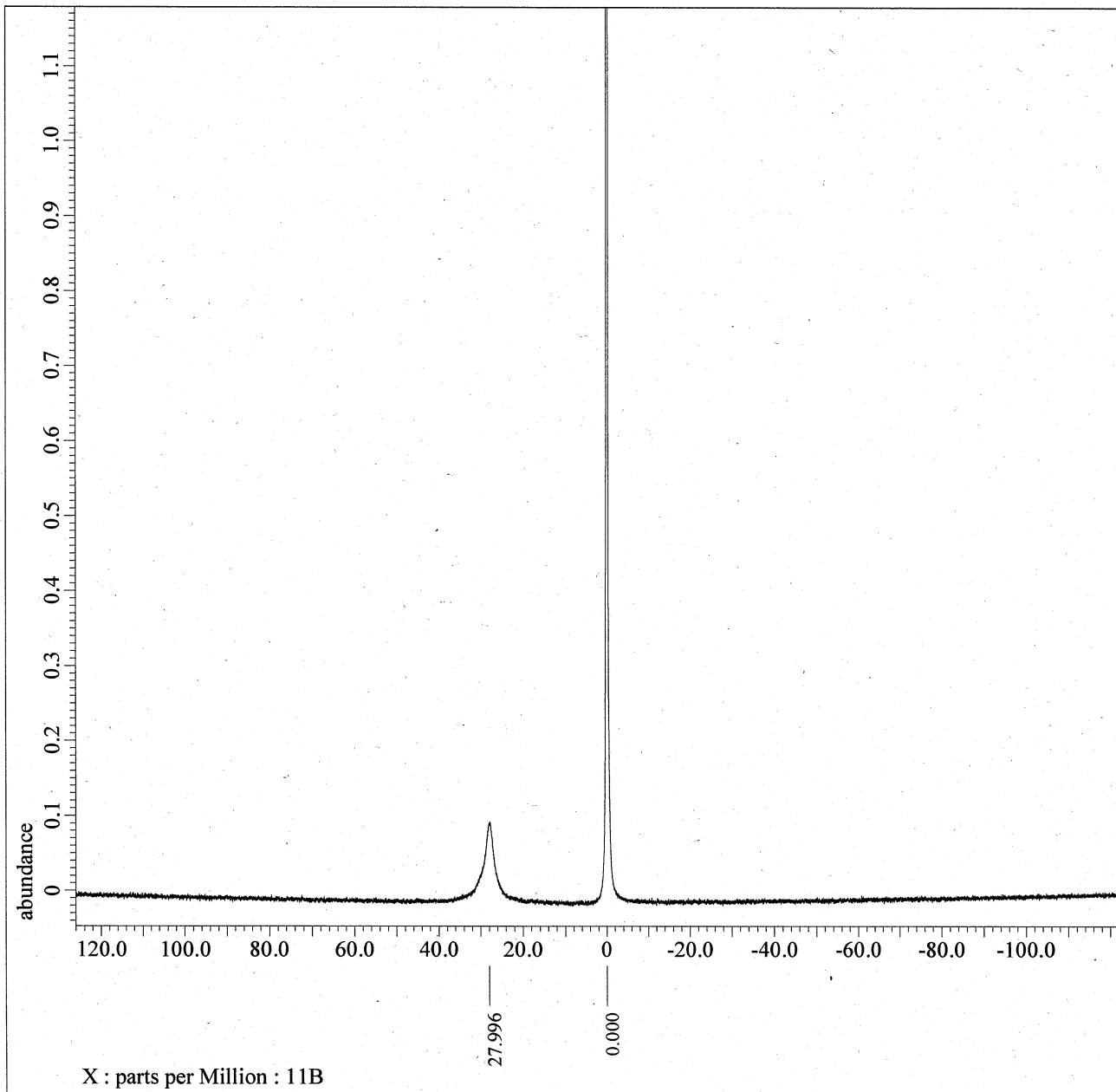
Field_Strength = 9.20197068[T] (390[M
X_Acq_Duration = 1.06430464[s]
X_Domain       = 13C
X_Freq         = 98.51479726[MHz]
X_Offset       = 100[ppm]
X_Points       = 32768
X_Prescans     = 4
X_Resolution   = 0.93958061[Hz]
X_Sweep        = 30.78817734[kHz]
Irr_Domain     = 1H
Irr_Freq       = 391.78655441[MHz]
Irr_Offset     = 5[ppm]
Clipped        = FALSE
Scans          = 200
Total_Scans    = 200
  
```

```

Relaxation_Delay = 2[s]
Recvr_Gain       = 60
Temp_Get         = 18.5[dC]
X_90_Width       = 9.11[us]
X_Acq_Time       = 1.06430464[s]
X_Angle          = 30[deg]
X_Atn            = 4.9[dB]
X_Pulse         = 3.03666667[us]
  
```







---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 2.0[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

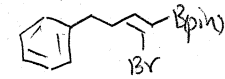
以下に由来: : PYD-079BF3-2.jdf

Filename = PYD-079BF3-5.jdf  
 Author = element  
 Experiment = single\_pulse\_dec  
 Sample Id = S#471172  
 Solvent = CHLOROFORM-D  
 Creation Time = 3-AUG-2018 12:52:13  
 Revision Time = 3-AUG-2018 13:24:59  
 Current Time = 3-AUG-2018 13:25:42

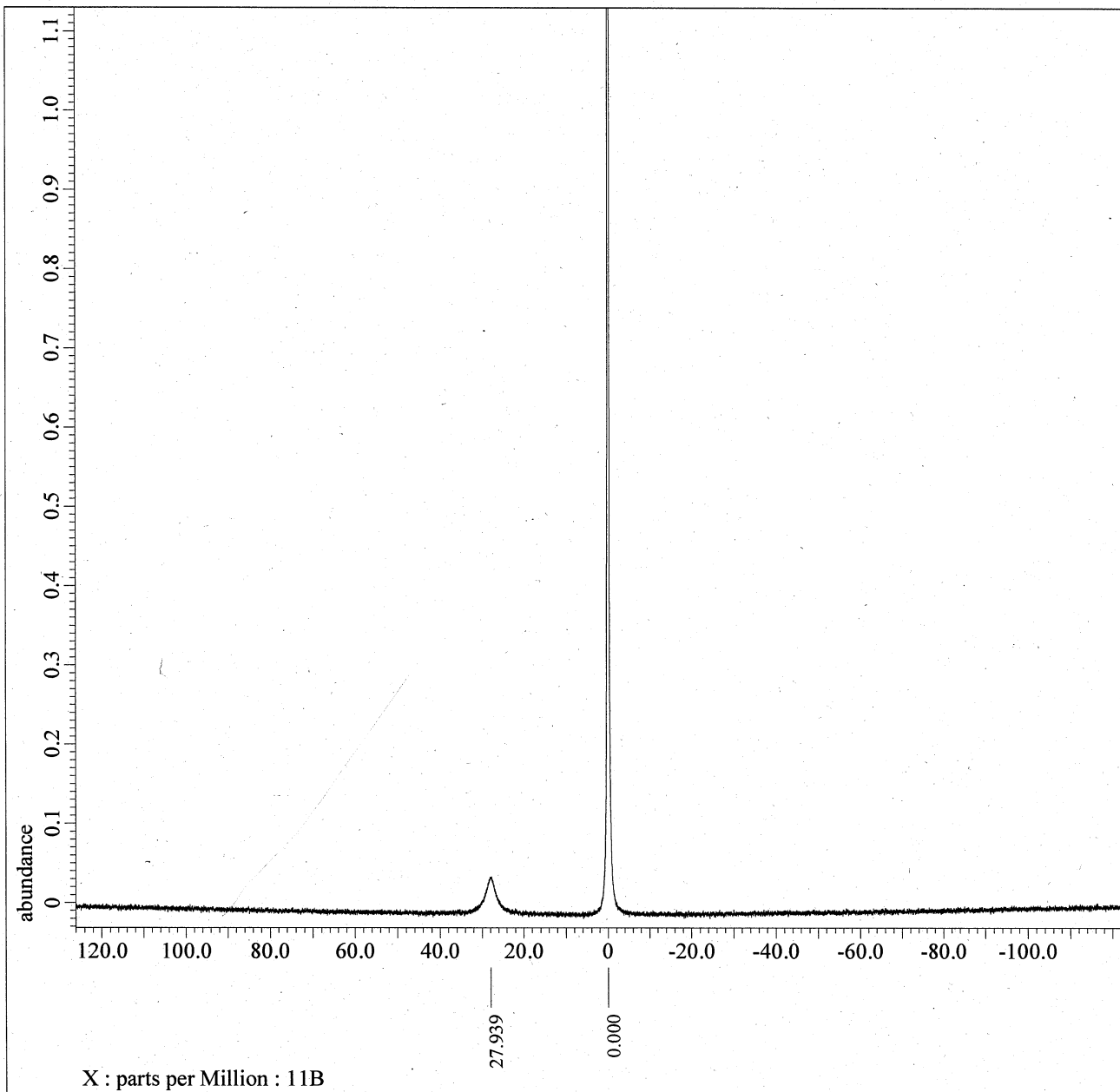
Comment = single pulse decoupl  
 Data Format = 1D COMPLEX  
 Dim Size = 26214  
 Dim Title = 11B  
 Dim Units = [ppm]  
 Dimensions = X  
 Site = ECX 400P  
 Spectrometer = DELTA2\_NMR

Field Strength = 9.2982153[T] (400[MH  
 X\_Acq\_Duration = 0.82313216[s]  
 X\_Domain = 11B  
 X\_Freq = 127.01553457[MHz]  
 X\_Offset = 0[ppm]  
 X\_Points = 32768  
 X\_Prescans = 4  
 X\_Resolution = 1.21487174[Hz]  
 X\_Sweep = 39.8089172[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 395.88430144[MHz]  
 Irr\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 256  
 Total\_Scans = 256

Relaxation\_Delay = 2[s]  
 Recvr\_Gain = 50  
 Temp\_Get = 24.3[dC]  
 X\_90\_Width = 10[us]  
 X\_Acq\_Time = 0.82313216[s]  
 X\_Angle = 30[deg]  
 X\_Atn = 4.8[dB]  
 X\_Pulse = 3.33333333[us]



(2)-3a



----- PROCESSING PARAMETERS -----  
 dc\_balance( 0, FALSE )  
 sexp( 2.0[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

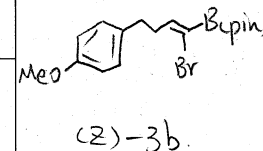
以下に由来: : PYD-136B-2.jdf

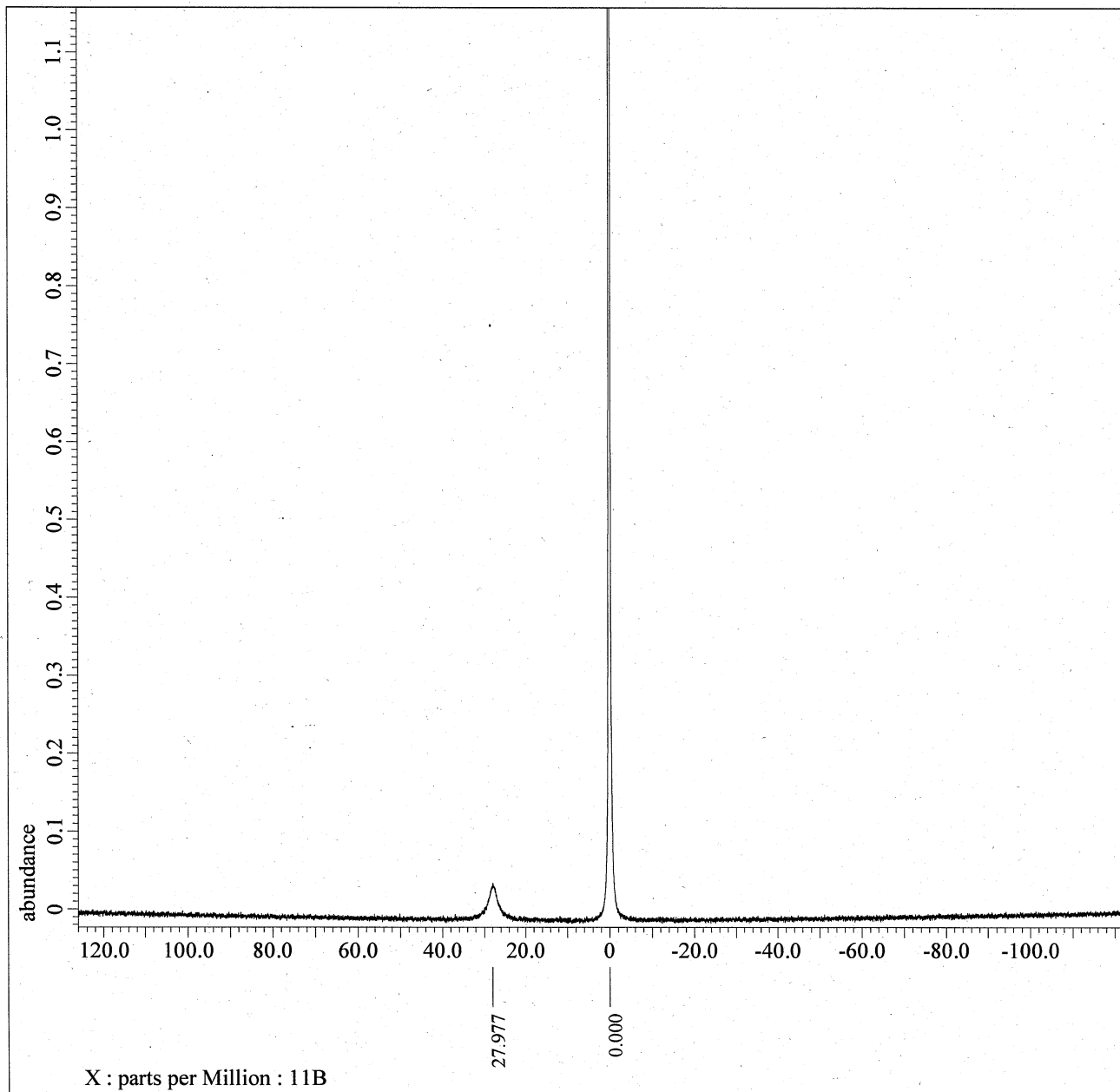
Filename = PYD-136B-5.jdf  
 Author = element  
 Experiment = single\_pulse\_dec  
 Sample\_Id = S#576753  
 Solvent = CHLOROFORM-D  
 Creation\_Time = 3-AUG-2018 15:48:11  
 Revision\_Time = 3-AUG-2018 16:25:17  
 Current\_Time = 3-AUG-2018 16:26:06

Comment = single pulse decoupl  
 Data\_Format = 1D COMPLEX  
 Dim\_Size = 26214  
 Dim\_Title = 11B  
 Dim\_Units = [ppm]  
 Dimensions = X  
 Site = ECX 400P  
 Spectrometer = DELTA2\_NMR

Field\_Strength = 9.2982153[T] (400[MH  
 X\_Acq\_Duration = 0.82313216[s]  
 X\_Domain = 11B  
 X\_Freq = 127.01553457[MHz]  
 X\_Offset = 0[ppm]  
 X\_Points = 32768  
 X\_Prescans = 4  
 X\_Resolution = 1.21487174[Hz]  
 X\_Sweep = 39.8089172[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 395.88430144[MHz]  
 Irr\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 256  
 Total\_Scans = 256

Relaxation\_Delay = 2[s]  
 Recvr\_Gain = 50  
 Temp\_Get = 23.8[dC]  
 X\_90\_Width = 10[us]  
 X\_Acq\_Time = 0.82313216[s]  
 X\_Angle = 30[deg]  
 X\_Atn = 4.8[dB]  
 X\_Pulse = 3.33333333[us]





---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 2.0[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

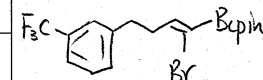
以下に由来: : PYD-124B-2.jdf

Filename = PYD-124B-4.jdf  
 Author = element  
 Experiment = single\_pulse\_dec  
 Sample Id = S#685446  
 Solvent = CHLOROFORM-D  
 Creation Time = 3-AUG-2018 18:49:21  
 Revision Time = 3-AUG-2018 19:26:55  
 Current Time = 3-AUG-2018 19:27:24

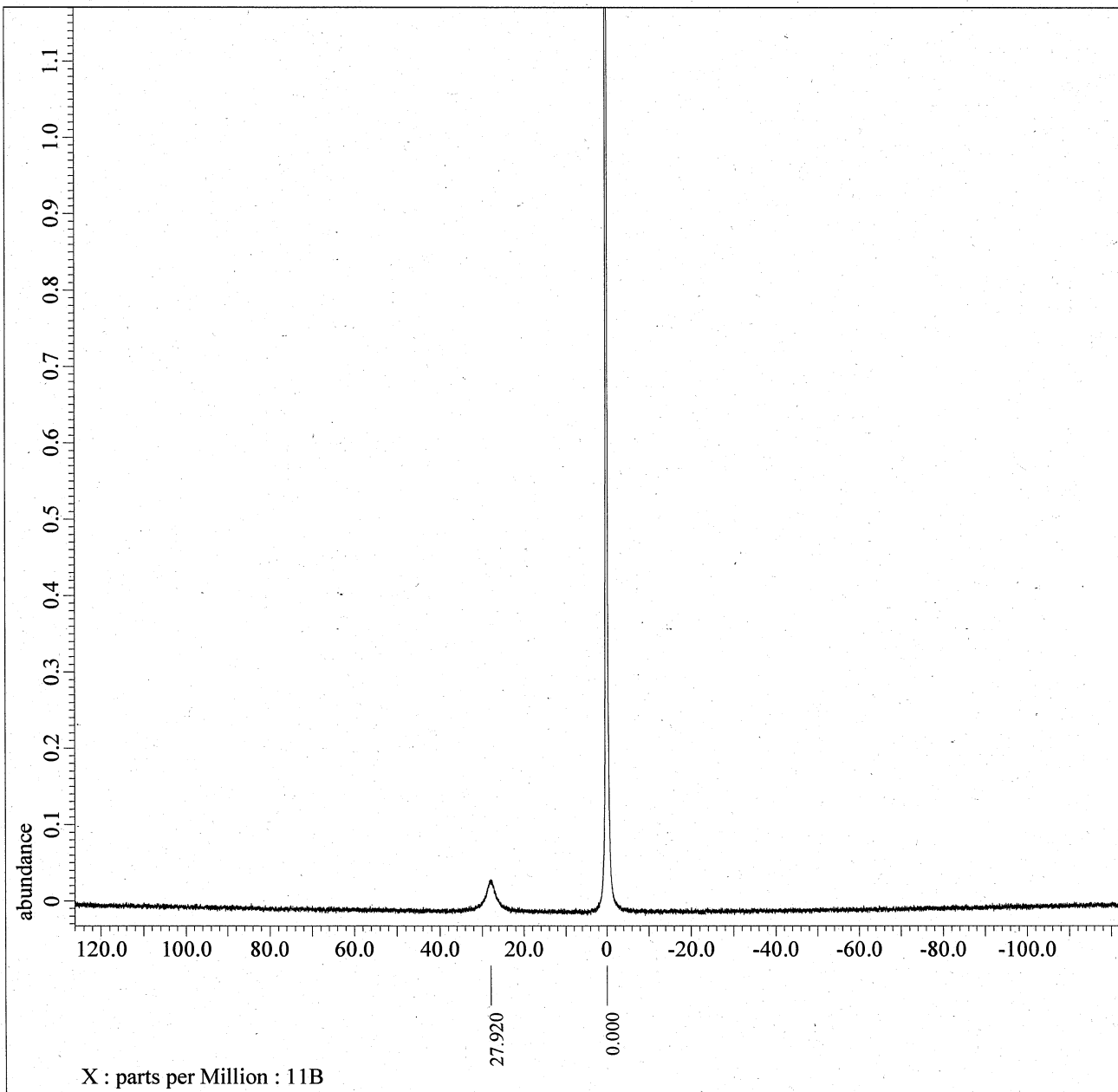
Comment = single pulse decoupl  
 Data Format = 1D COMPLEX  
 Dim Size = 26214  
 Dim Title = 11B  
 Dim Units = [ppm]  
 Dimensions = X  
 Site = ECX 400P  
 Spectrometer = DELTA2\_NMR

Field Strength = 9.2982153[T] (400[MH  
 X Acq\_Duration = 0.82313216[s]  
 X\_Domain = 11B  
 X Freq = 127.01553457[MHz]  
 X\_Offset = 0[ppm]  
 X\_Points = 32768  
 X\_Prescans = 4  
 X\_Resolution = 1.21487174[Hz]  
 X\_Sweep = 39.8089172[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 395.88430144[MHz]  
 Irr\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 256  
 Total Scans = 256

Relaxation\_Delay = 2[s]  
 Recvr\_Gain = 50  
 Temp\_Get = 24.2[dC]  
 X\_90\_Width = 10[us]  
 X Acq\_Time = 0.82313216[s]  
 X\_Angle = 30[deg]  
 X\_Atn = 4.8[dB]  
 X\_Pulse = 3.33333333[us]



(2)-3C



----- PROCESSING PARAMETERS -----  
 dc\_balance( 0, FALSE )  
 sexp( 2.0[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

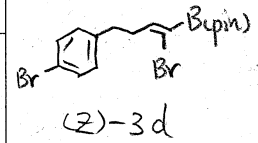
以下に由来: : PYD-135B-2.jdf

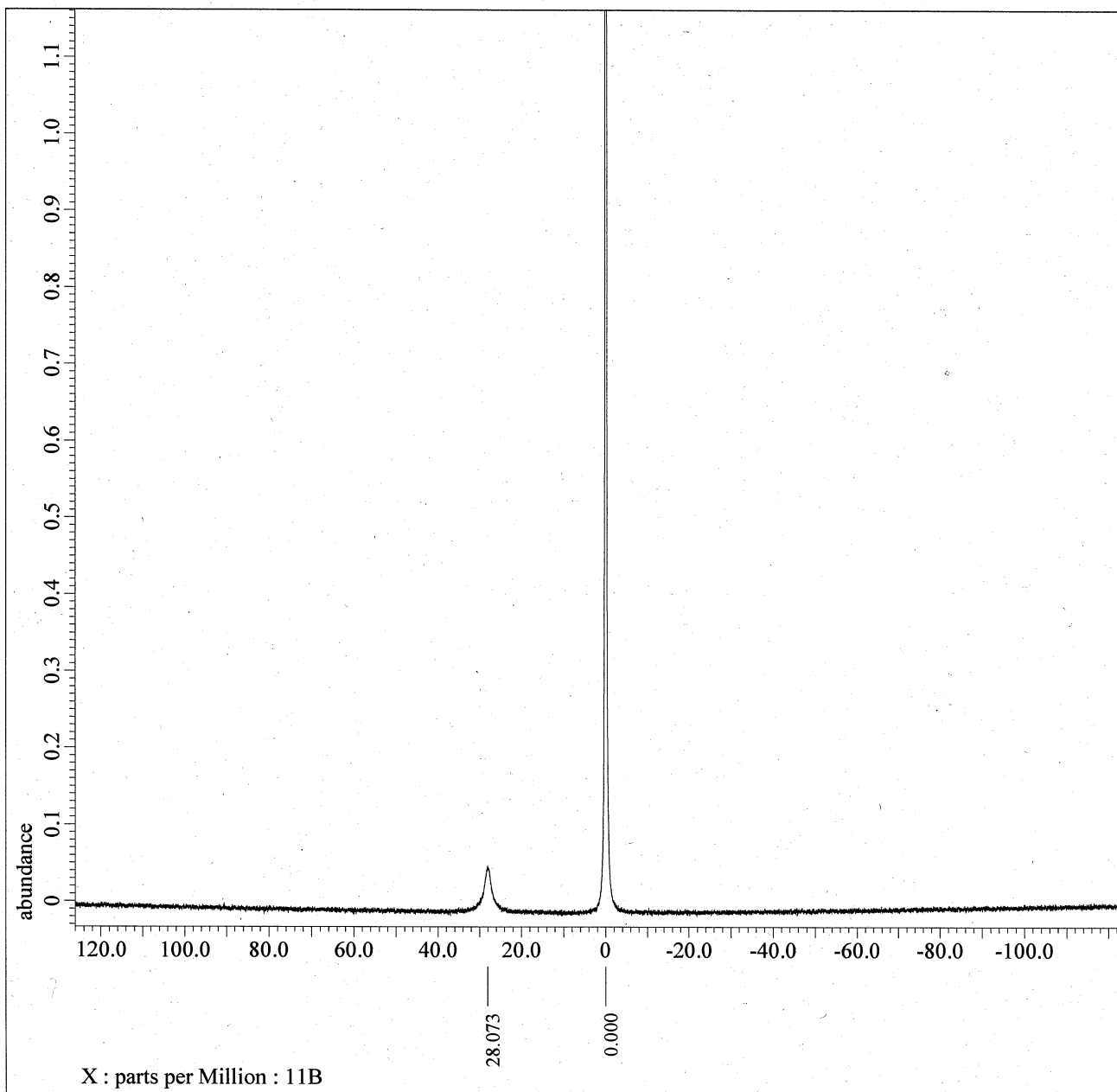
Filename = PYD-135B-5.jdf  
 Author = element  
 Experiment = single\_pulse\_dec  
 Sample\_Id = S#344161  
 Solvent = CHLOROFORM-D  
 Creation\_Time = 4-AUG-2018 09:20:32  
 Revision\_Time = 4-AUG-2018 10:04:38  
 Current\_Time = 4-AUG-2018 10:05:06

Comment = single pulse decoupl  
 Data\_Format = 1D COMPLEX  
 Dim\_Size = 26214  
 Dim\_Title = 11B  
 Dim\_Units = [ppm]  
 Dimensions = X  
 Site = ECX 400P  
 Spectrometer = DELTA2\_NMR

Field\_Strength = 9.2982153[T] (400[MH  
 X\_Acq\_Duration = 0.82313216[s]  
 X\_Domain = 11B  
 X\_Freq = 127.01553457[MHz]  
 X\_Offset = 0[ppm]  
 X\_Points = 32768  
 X\_Prescans = 4  
 X\_Resolution = 1.21487174[Hz]  
 X\_Sweep = 39.8089172[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 395.88430144[MHz]  
 Irr\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 256  
 Total\_Scans = 256

Relaxation\_Delay = 2[s]  
 Recvr\_Gain = 50  
 Temp\_Get = 23.6[dc]  
 X\_90\_Width = 10[us]  
 X\_Acq\_Time = 0.82313216[s]  
 X\_Angle = 30[deg]  
 X\_Atn = 4.8[db]  
 X\_Pulse = 3.33333333[us]





```

---- PROCESSING PARAMETERS ----
dc balance( 0, FALSE )
sexp( 2.0[Hz], 0.0[s] )
trapezoid3( 0[%], 80[%], 100[%] )
zerofill( 1 )
fft( 1, TRUE, TRUE )
machinephase
ppm

```

以下に由来: : PYD-103B-2.jdf

```

Filename      = PYD-103B-4.jdf
Author        = element
Experiment    = single_pulse_dec
Sample_Id     = S#485182
Solvent       = CHLOROFORM-D
Creation Time = 4-AUG-2018 13:15:40
Revision Time = 4-AUG-2018 13:52:15
Current Time  = 4-AUG-2018 13:52:48

```

```

Comment       = single pulse decoupl
Data Format    = 1D COMPLEX
Dim Size      = 26214
Dim Title     = 11B
Dim Units     = [ppm]
Dimensions    = X
Site          = ECX 400P
Spectrometer  = DELTA2_NMR

```

```

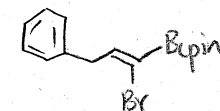
Field Strength = 9.2982153[T] (400[MH
X_Acq_Duration = 0.82313216[s]
X_Domain       = 11B
X_Freq         = -127.01553457[MHz]
X_Offset       = 0[ppm]
X_Points       = 32768
X_Prescans     = 4
X_Resolution   = 1.21487174[Hz]
X_Sweep        = 39.8089172[kHz]
Irr_Domain     = 1H
Irr_Freq       = 395.88430144[MHz]
Irr_Offset     = 5[ppm]
Clipped        = FALSE
Scans          = 256
Total_Scans    = 256

```

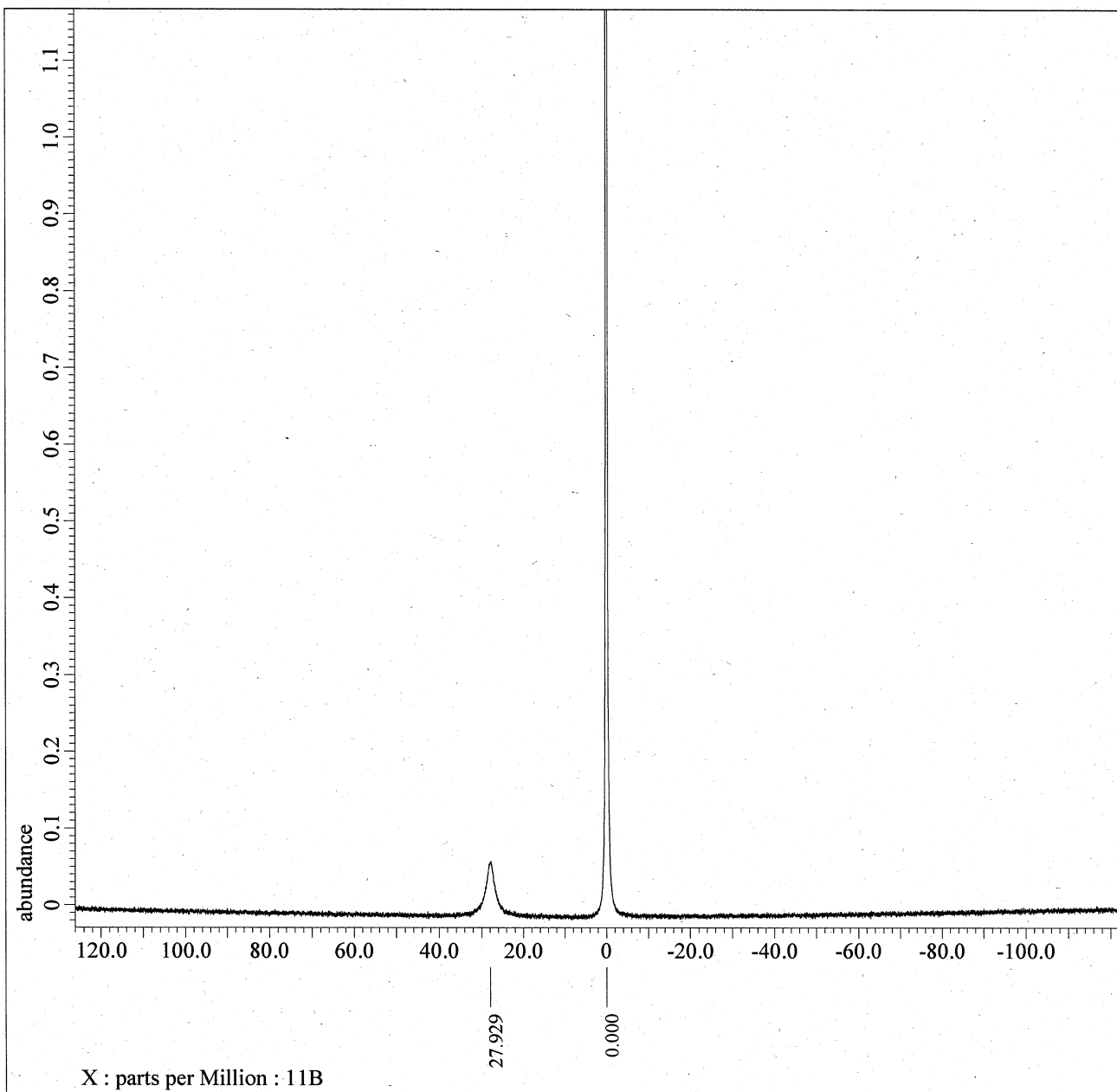
```

Relaxation_Delay = 2[s]
Recvr_Gain       = 50
Temp_Get         = 23.8[dC]
X_90_Width      = 10[us]
X_Acq_Time      = 0.82313216[s]
X_Angle         = 30[deg]
X_Atn           = 4.8[dB]
X_Pulse         = 3.33333333[us]

```



(Z)-3e



---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 2.0[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

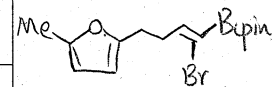
以下に由来: : PYD-109B-2.jdf

Filename = PYD-109B-5.jdf  
 Author = element  
 Experiment = single\_pulse\_dec  
 Sample\_Id = S#586561  
 Solvent = CHLOROFORM-D  
 Creation\_Time = 4-AUG-2018 16:04:32  
 Revision\_Time = 4-AUG-2018 16:53:28  
 Current\_Time = 4-AUG-2018 16:54:03

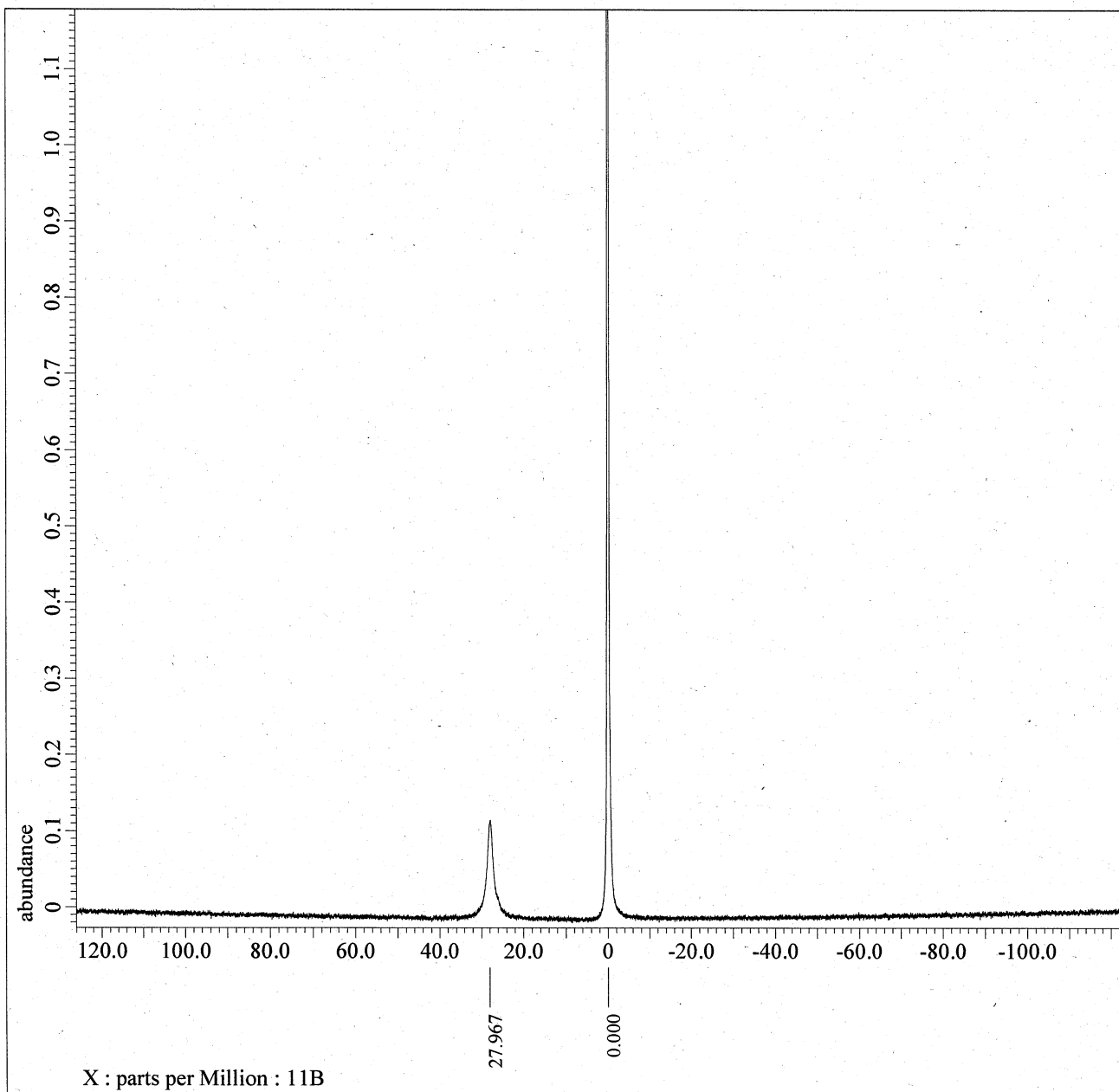
Comment = single pulse decoupl  
 Data\_Format = 1D COMPLEX  
 Dim\_Size = 26214  
 Dim\_Title = 11B  
 Dim\_Units = [ppm]  
 Dimensions = X  
 Site = ECX 400P  
 Spectrometer = DELTA2\_NMR

Field\_Strength = 9.2982153[T] (400[MH  
 X\_Acq\_Duration = 0.82313216[s]  
 X\_Domain = 11B  
 X\_Freq = 127.01553457[MHz]  
 X\_Offset = 0[ppm]  
 X\_Points = 32768  
 X\_Prescans = 4  
 X\_Resolution = 1.21487174[Hz]  
 X\_Sweep = 39.8089172[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 395.88430144[MHz]  
 Irr\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 256  
 Total\_Scans = 256

Relaxation\_Delay = 2[s]  
 Recvr\_Gain = 50  
 Temp\_Get = 23.7[dc]  
 X\_90\_Width = 10[us]  
 X\_Acq\_Time = 0.82313216[s]  
 X\_Angle = 30[deg]  
 X\_Atn = 4.8[db]  
 X\_Pulse = 3.33333333[us]



(2)-3f



```

---- PROCESSING PARAMETERS ----
dc_balance( 0, FALSE )
sexp( 2.0[Hz], 0.0[s] )
trapezoid3( 0[%], 80[%], 100[%] )
zerofill( 1 )
fft( 1, TRUE, TRUE )
machinephase
ppm
  
```

以下に由来: : PYD-107B-2.jdf

```

Filename      = PYD-107B-4.jdf
Author        = element
Experiment    = single_pulse_dec
Sample_Id     = S#719110
Solvent       = CHLOROFORM-D
Creation_Time = 4-AUG-2018 19:45:28
Revision_Time = 4-AUG-2018 20:19:37
Current_Time  = 4-AUG-2018 20:19:52
  
```

```

Comment       = single pulse decoupl
Data_Format   = 1D COMPLEX
Dim_Size      = 26214
Dim_Title     = 11B
Dim_Units     = [ppm]
Dimensions    = X
Site          = ECX 400P
Spectrometer  = DELTA2_NMR
  
```

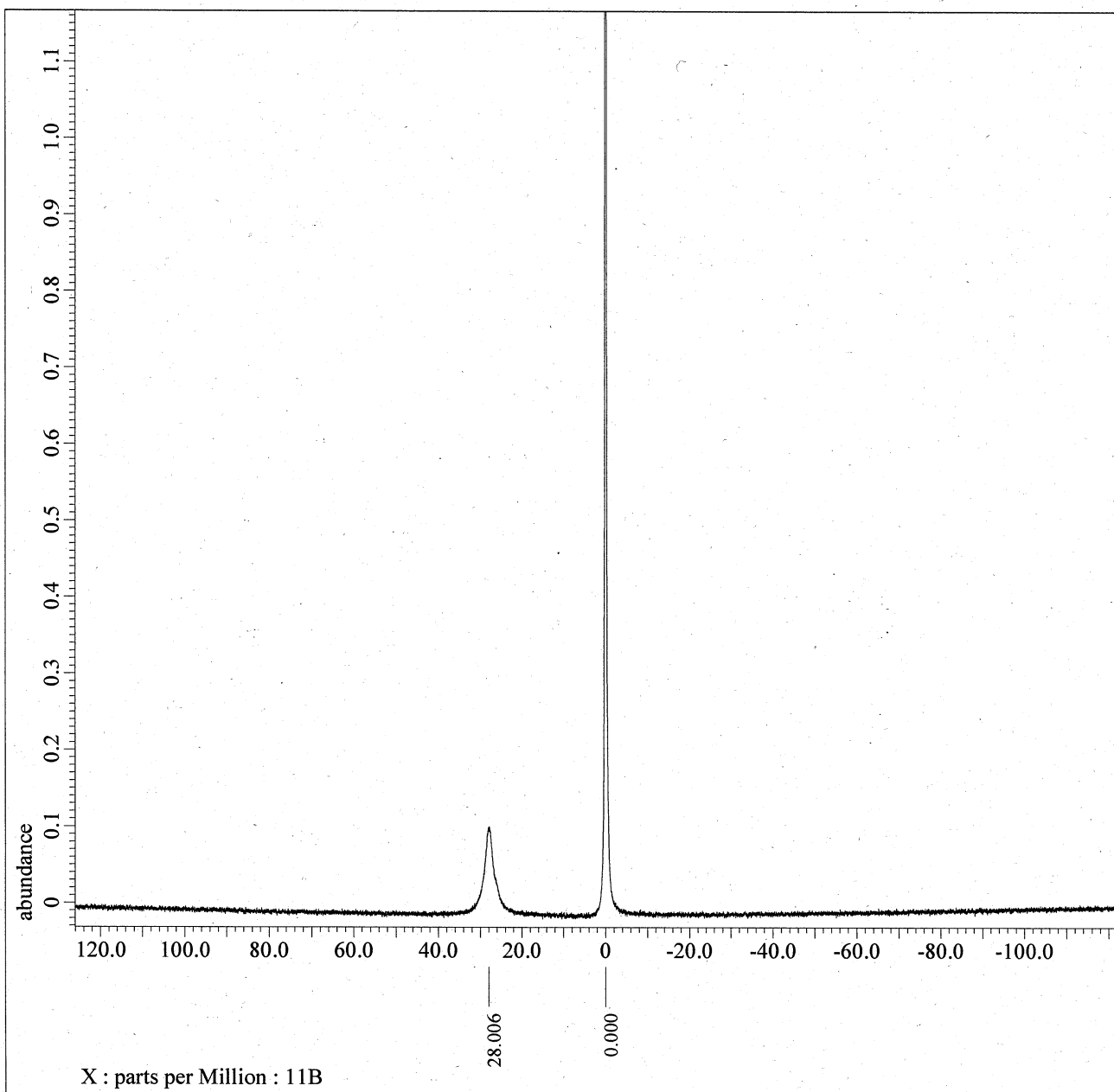
```

Field Strength = 9.2982153[T] (400[MH
X_Acq_Duration = 0.82313216[s]
X_Domain       = 11B
X_Freq         = 127.01553457[MHz]
X_Offset       = 0[ppm]
X_Points       = 32768
X_Prescans     = 4
X_Resolution   = 1.21487174[Hz]
X_Sweep        = 39.8089172[kHz]
Irr_Domain     = 1H
Irr_Freq       = 395.88430144[MHz]
Irr_Offset     = 5[ppm]
Clipped        = FALSE
Scans          = 256
Total_Scans    = 256
  
```

```

Relaxation_Delay = 2[s]
Recvr_Gain       = 50
Temp_Get         = 23.7[dc]
X_90_Width       = 10[us]
X_Acq_Time       = 0.82313216[s]
X_Angle          = 30[deg]
X_Atn            = 4.8[dB]
X_Pulse          = 3.33333333[us]
  
```

Me CCCC(Br)C Bpin  
Br  
(2)-3g



```

---- PROCESSING PARAMETERS ----
dc_balance( 0, FALSE )
sexp( 2.0[Hz], 0.0[s] )
trapezoid3( 0[%], 80[%], 100[%] )
zerofill( 1 )
fft( 1, TRUE, TRUE )
machinephase
ppm
  
```

以下に由来: : PYD-096B-2.jdf

```

Filename      = PYD-096B-5.jdf
Author        = element
Experiment    = single_pulse_dec
Sample_Id     = S#480725
Solvent       = CHLOROFORM-D
Creation Time  = 5-AUG-2018 13:08:09
Revision Time  = 5-AUG-2018 13:44:33
Current Time   = 5-AUG-2018 13:44:52
  
```

```

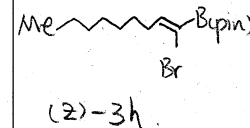
Comment       = single pulse decoupl
Data Format    = 1D COMPLEX
Dim Size      = 26214
Dim Title     = 11B
Dim Units     = [ppm]
Dimensions    = X
Site          = ECX 400P
Spectrometer  = DELTA2_NMR
  
```

```

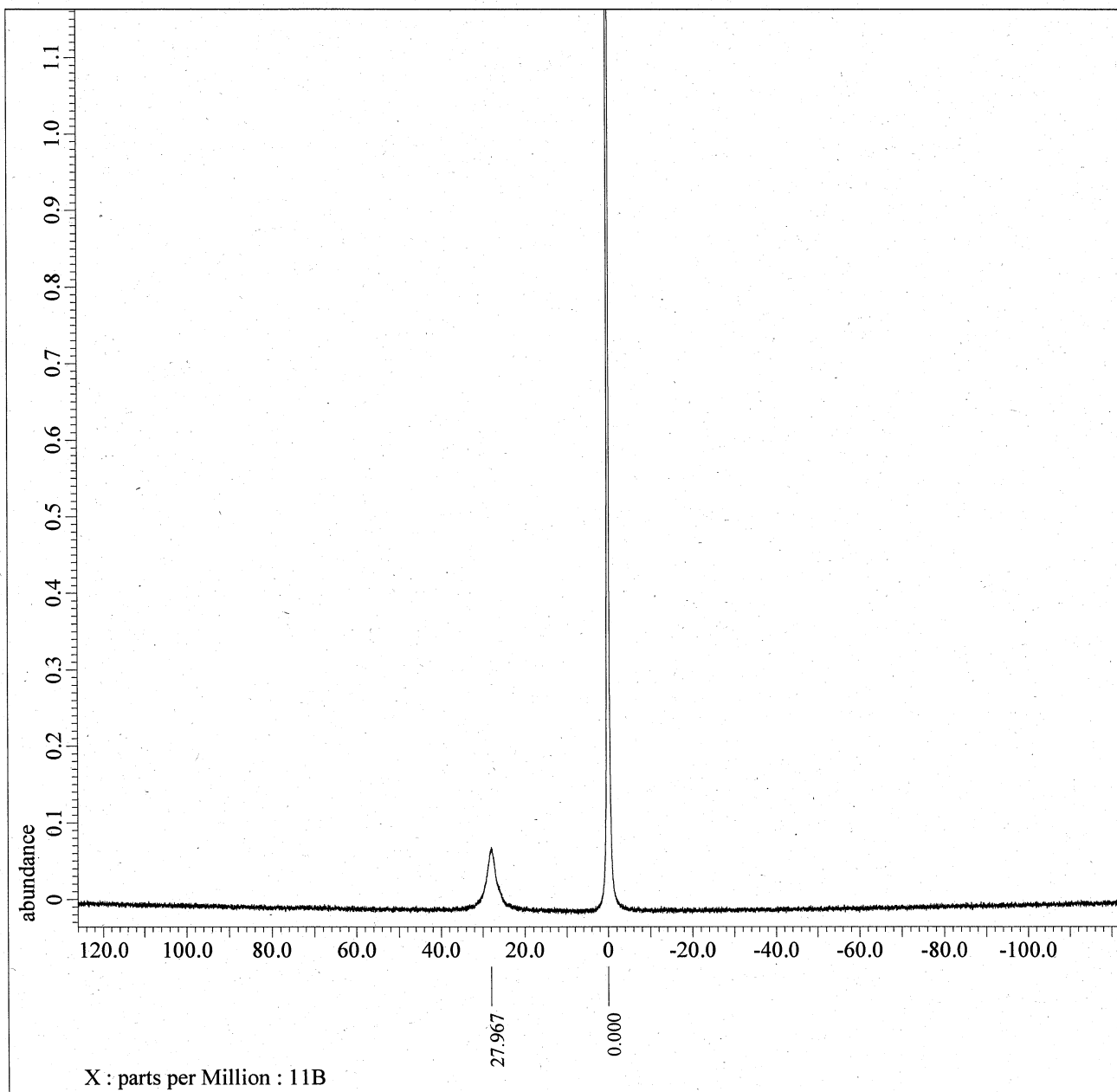
Field Strength = 9.2982153[T] (400[MH
X Acq Duration = 0.82313216[s]
X Domain       = 11B
X Freq         = 127.01553457[MHz]
X Offset       = 0[ppm]
X Points       = 32768
X Prescans     = 4
X Resolution   = 1.21487174[Hz]
X Sweep       = 39.8089172[kHz]
Irr Domain     = 1H
Irr Freq       = 395.88430144[MHz]
Irr Offset     = 5[ppm]
Clipped        = FALSE
Scans          = 256
Total Scans    = 256
  
```

```

Relaxation_Delay = 2[s]
Recvr Gain       = 50
Temp_Get         = 23.6[dc]
X_90_Width      = 10[us]
X Acq Time       = 0.82313216[s]
X Angle          = 30[deg]
X Atn            = 4.8[dB]
X Pulse         = 3.33333333[us]
  
```







---- PROCESSING PARAMETERS ----  
 dc balance( 0, FALSE )  
 sexp( 2.0[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

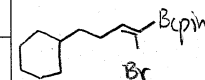
以下に由来: : PYD-115B-2.jdf

Filename = PYD-115B-5.jdf  
 Author = element  
 Experiment = single\_pulse\_dec  
 Sample\_Id = S#555667  
 Solvent = CHLOROFORM-D  
 Creation Time = 5-AUG-2018 15:13:04  
 Revision Time = 5-AUG-2018 15:48:09  
 Current Time = 5-AUG-2018 15:48:34

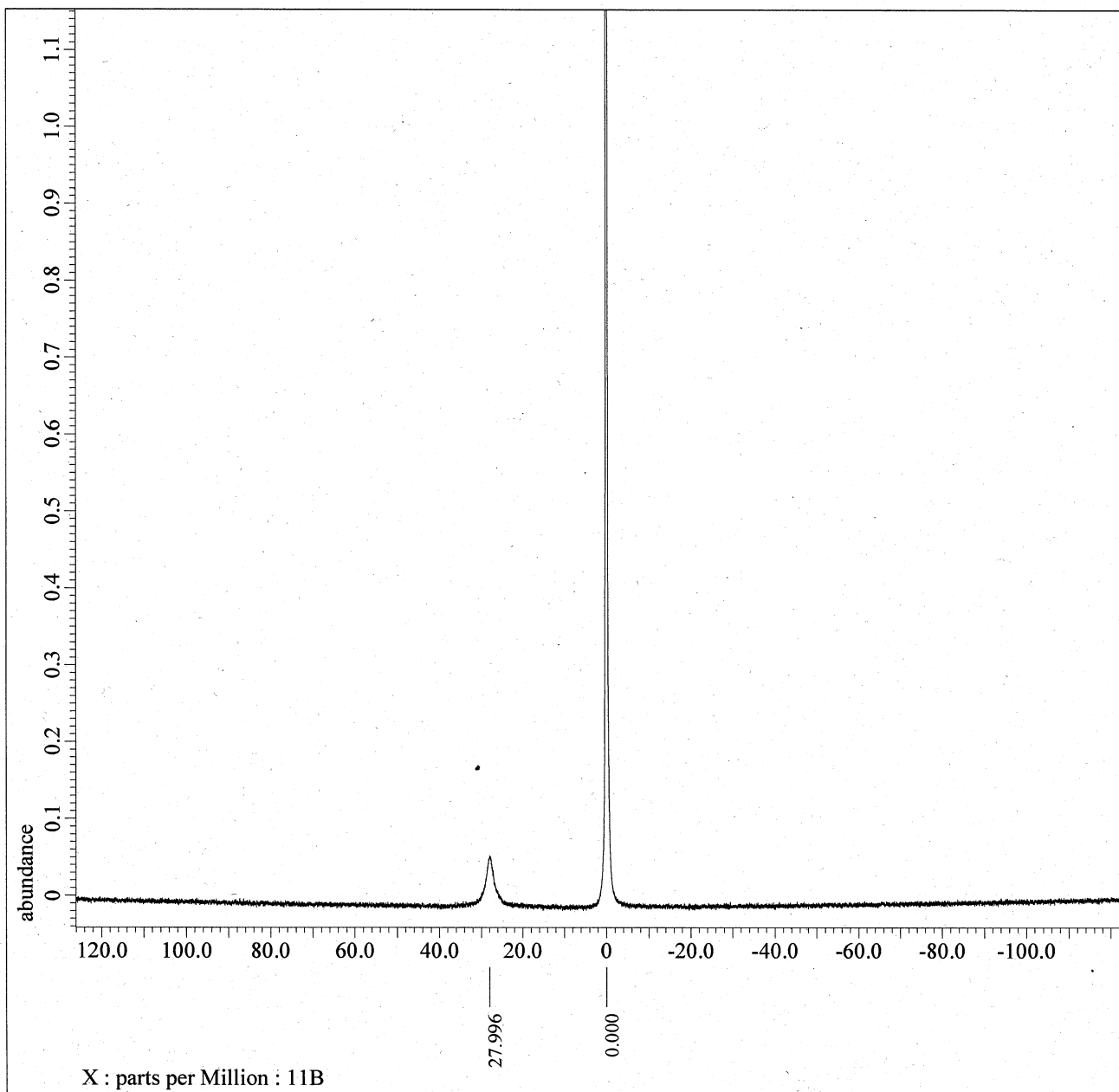
Comment = single pulse decoupl  
 Data Format = 1D COMPLEX  
 Dim Size = 26214  
 Dim Title = 11B  
 Dim Units = [ppm]  
 Dimensions = X  
 Site = ECX 400P  
 Spectrometer = DELTA2\_NMR

Field Strength = 9.2982153[T] (400[MH  
 X\_Acq\_Duration = 0.82313216[s]  
 X\_Domain = 11B  
 X\_Freq = 127.01553457[MHz]  
 X\_Offset = 0[ppm]  
 X Points = 32768  
 X\_Prescans = 4  
 X\_Resolution = 1.21487174[Hz]  
 X\_Sweep = 39.8089172[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 395.88430144[MHz]  
 Irr\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 256  
 Total Scans = 256

Relaxation\_Delay = 2[s]  
 Recvr Gain = 50  
 Temp\_Get = 23.7[dc]  
 X\_90\_Width = 10[us]  
 X\_Acq\_Time = 0.82313216[s]  
 X\_Angle = 30[deg]  
 X\_Atn = 4.8[dB]  
 X\_Pulse = 3.33333333[us]



(2)-3i



---- PROCESSING PARAMETERS ----  
 dc balance( 0, FALSE )  
 sexp( 2.0[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

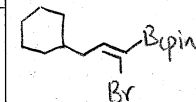
以下に由来: : PYD-112B-2.jdf

Filename = PYD-112B-8.jdf  
 Author = element  
 Experiment = single\_pulse\_dec  
 Sample\_Id = S#624281  
 Solvent = CHLOROFORM-D  
 Creation Time = 5-AUG-2018 17:07:45  
 Revision Time = 5-AUG-2018 17:42:50  
 Current Time = 5-AUG-2018 17:43:10

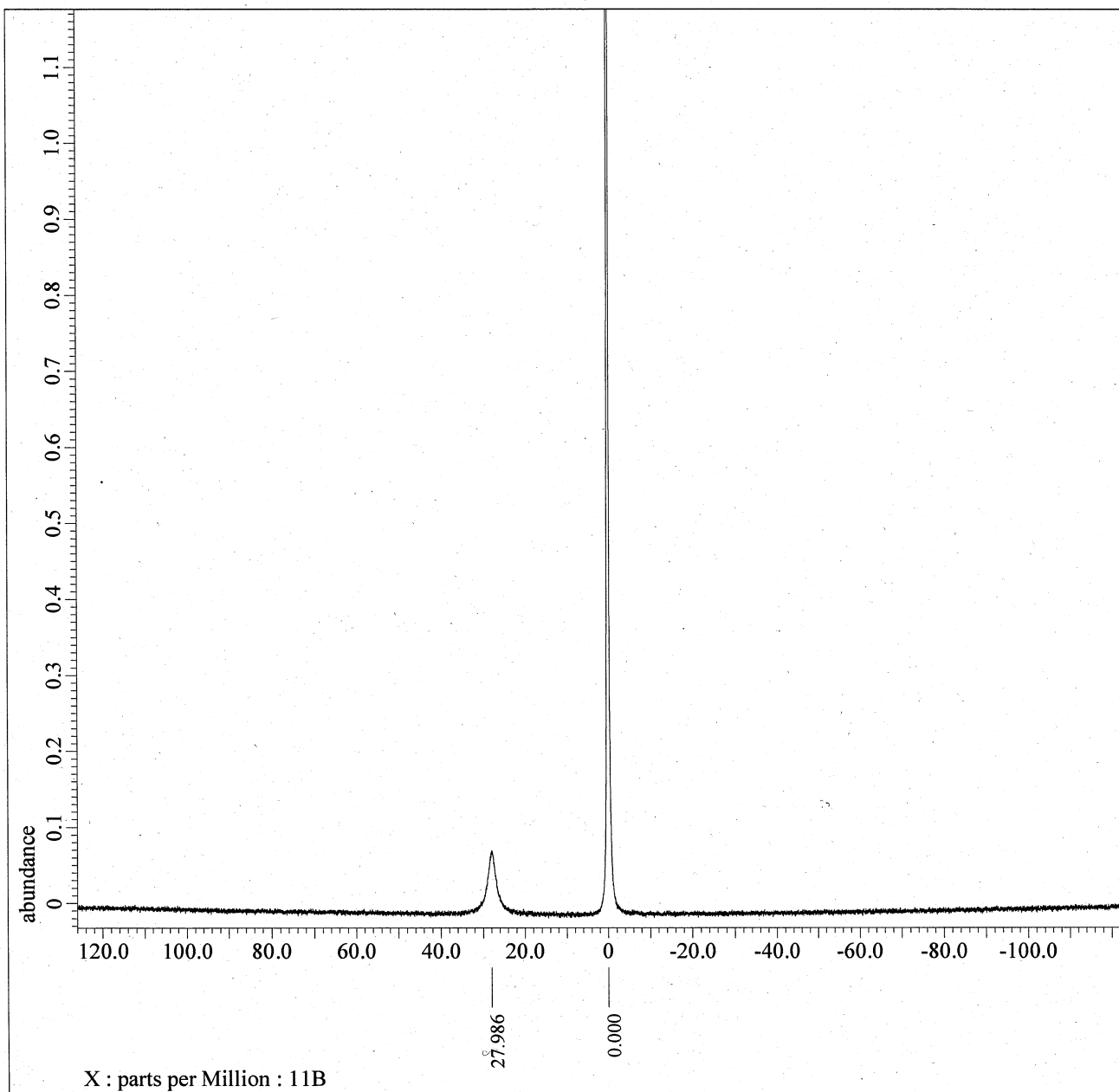
Comment = single pulse decoupl  
 Data Format = 1D COMPLEX  
 Dim Size = 26214  
 Dim Title = 11B  
 Dim Units = [ppm]  
 Dimensions = X  
 Site = ECX 400P  
 Spectrometer = DELTA2\_NMR

Field Strength = 9.2982153[T] (400[MH  
 X Acq\_Duration = 0.82313216[s]  
 X Domain = 11B  
 X Freq = 127.01553457 [MHz]  
 X Offset = 0[ppm]  
 X Points = 32768  
 X Prescans = 4  
 X Resolution = 1.21487174 [Hz]  
 X Sweep = 39.8089172 [kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 395.88430144 [MHz]  
 Irr\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 256  
 Total\_Scans = 256

Relaxation\_Delay = 2[s]  
 Recvr Gain = 50  
 Temp\_Get = 23.5[dC]  
 X\_90\_Width = 10[us]  
 X Acq Time = 0.82313216[s]  
 X Angle = 30[deg]  
 X\_Atn = 4.8[dB]  
 X\_Pulse = 3.33333333[us]



(2)-3j



```

---- PROCESSING PARAMETERS ----
dc balance( 0, FALSE )
sexp( 2.0[Hz], 0.0[s] )
trapezoid3( 0[%], 80[%], 100[%] )
zerofill( 1 )
fft( 1, TRUE, TRUE )
machinephase
ppm
  
```

以下に由来: : PYD-118B-2.jdf

```

Filename      = PYD-118B-5.jdf
Author        = element
Experiment     = single_pulse_dec
Sample_Id     = S#356082
Solvent       = CHLOROFORM-D
Creation Time  = 6-AUG-2018 09:40:26
Revision Time  = 6-AUG-2018 10:18:23
Current Time   = 6-AUG-2018 10:18:46
  
```

```

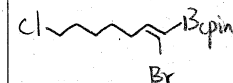
Comment       = single pulse decoupl
Data Format    = 1D COMPLEX
Dim_Size      = 26214
Dim_Title     = 11B
Dim_Units     = [ppm]
Dimensions    = X
Site          = ECX 400P
Spectrometer  = DELTA2_NMR
  
```

```

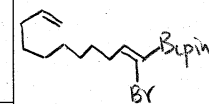
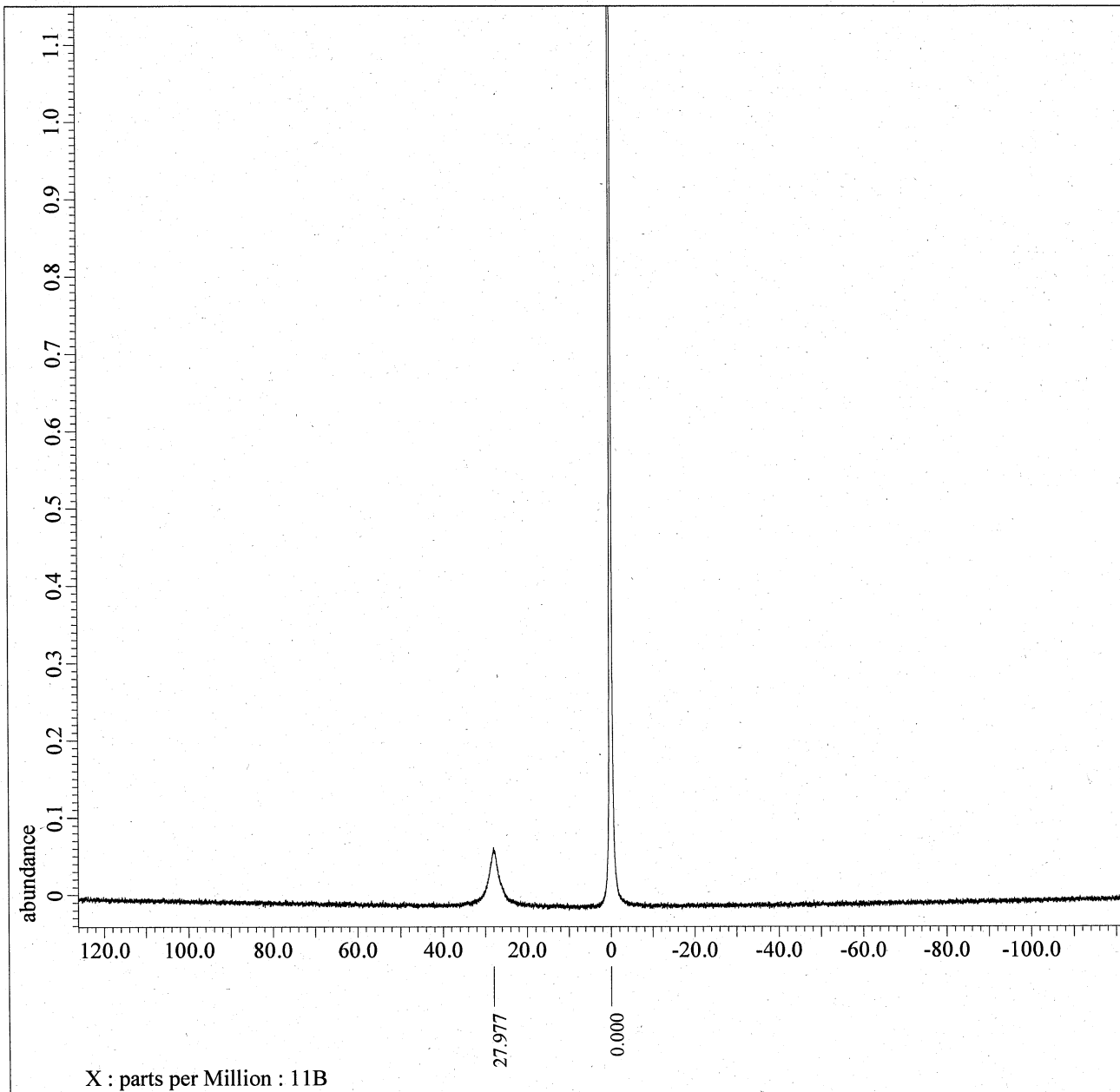
Field Strength = 9.2982153[T] (400[MH
X_Acq_Duration = 0.82313216[s]
X_Domain       = 11B
X_Freq         = 127.01553457[MHz]
X_Offset       = 0[ppm]
X_Points       = 32768
X_Prescans     = 4
X_Resolution   = 1.21487174[Hz]
X_Sweep        = 39.8089172[kHz]
Irr_Domain     = 1H
Irr_Freq       = 395.88430144[MHz]
Irr_Offset     = 5[ppm]
Clipped        = FALSE
Scans          = 256
Total_Scans    = 256
  
```

```

Relaxation_Delay = 2[s]
Recvr_Gain       = 50
Temp_Get         = 23.4[dC]
X_90_Width       = 10[us]
X_Acq_Time       = 0.82313216[s]
X_Angle          = 30[deg]
X_Atn            = 4.8[dB]
X_Pulse          = 3.33333333[us]
  
```



(2)-3K



(2)-3L

----- PROCESSING PARAMETERS -----  
 dc balance ( 0, FALSE )  
 sexp( 2.0[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

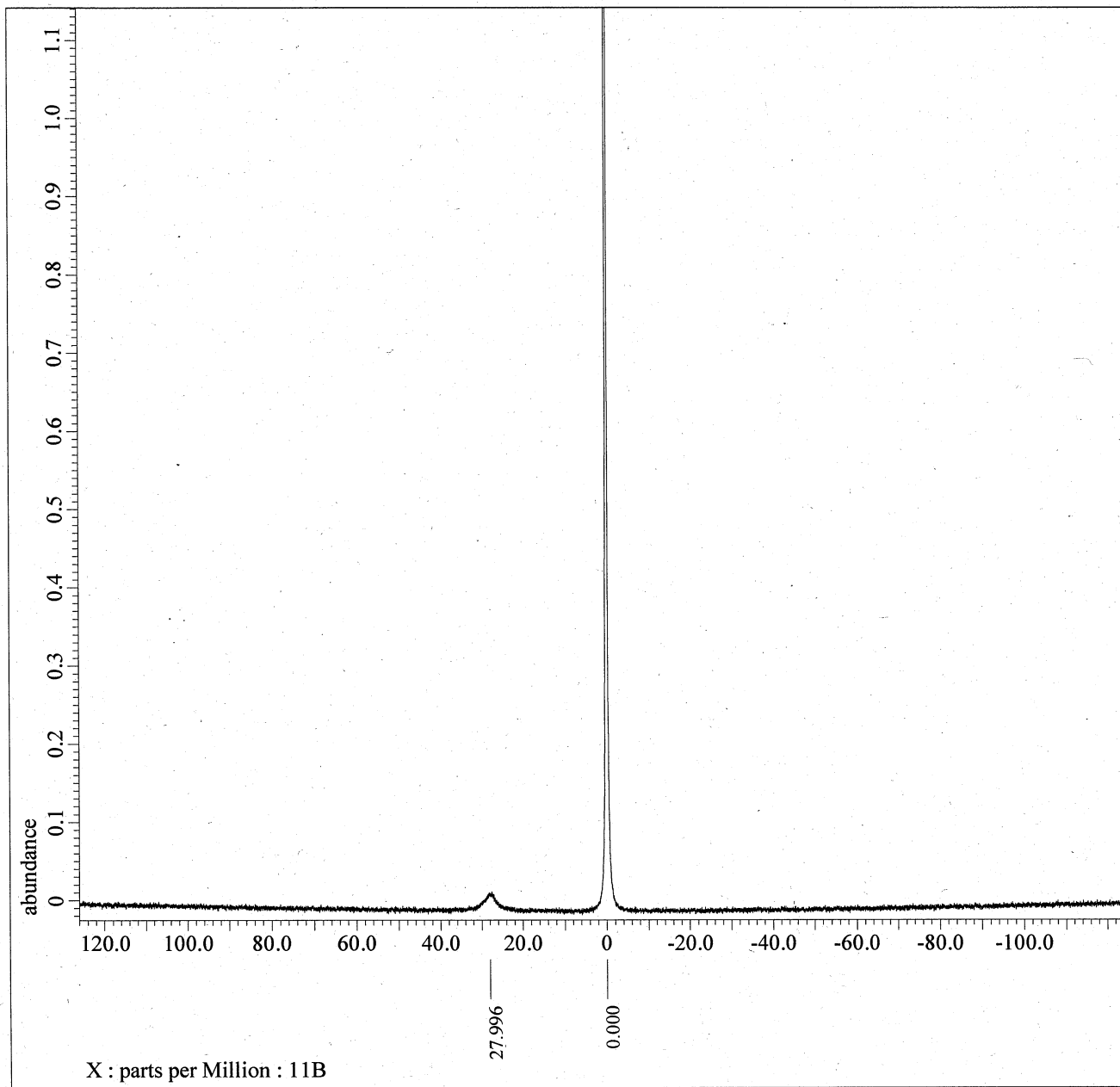
以下に由来: : PYD-121B-2.jdf

Filename = PYD-121B-5.jdf  
 Author = element  
 Experiment = single\_pulse\_dec  
 Sample\_Id = S#402233  
 Solvent = CHLOROFORM-D  
 Creation\_Time = 6-AUG-2018 10:57:31  
 Revision\_Time = 6-AUG-2018 11:34:56  
 Current\_Time = 6-AUG-2018 11:35:15

Comment = single pulse decoupl  
 Data\_Format = 1D COMPLEX  
 Dim\_Size = 26214  
 Dim\_Title = 11B  
 Dim\_Units = [ppm]  
 Dimensions = X  
 Site = ECX 400P  
 Spectrometer = DELTA2\_NMR

Field\_Strength = 9.2982153[T] (400[MH  
 X\_Acq\_Duration = 0.82313216[s]  
 X\_Domain = 11B  
 X\_Freq = 127.01553457[MHz]  
 X\_Offset = 0[ppm]  
 X\_Points = 32768  
 X\_Prescans = 4  
 X\_Resolution = 1.21487174[Hz]  
 X\_Sweep = 39.8089172[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 395.88430144[MHz]  
 Irr\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 256  
 Total\_Scans = 256

Relaxation\_Delay = 2[s]  
 Recvr\_Gain = 50  
 Temp\_Get = 23.6[dc]  
 X\_90\_Width = 10[us]  
 X\_Acq\_Time = 0.82313216[s]  
 X\_Angle = 30[deg]  
 X\_Atn = 4.8[db]  
 X\_Pulse = 3.33333333[us]



---- PROCESSING PARAMETERS ----  
 dc\_balance( 0, FALSE )  
 sexp( 2.0[Hz], 0.0[s] )  
 trapezoid3( 0[%], 80[%], 100[%] )  
 zerofill( 1 )  
 fft( 1, TRUE, TRUE )  
 machinephase  
 ppm

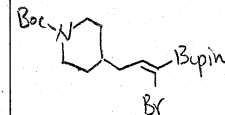
以下に由来: : PYD-137B-2.jdf

Filename = PYD-137B-5.jdf  
 Author = element  
 Experiment = single\_pulse\_dec  
 Sample\_Id = S#523614  
 Solvent = CHLOROFORM-D  
 Creation\_Time = 6-AUG-2018 14:19:38  
 Revision\_Time = 6-AUG-2018 14:58:05  
 Current\_Time = 6-AUG-2018 14:58:11

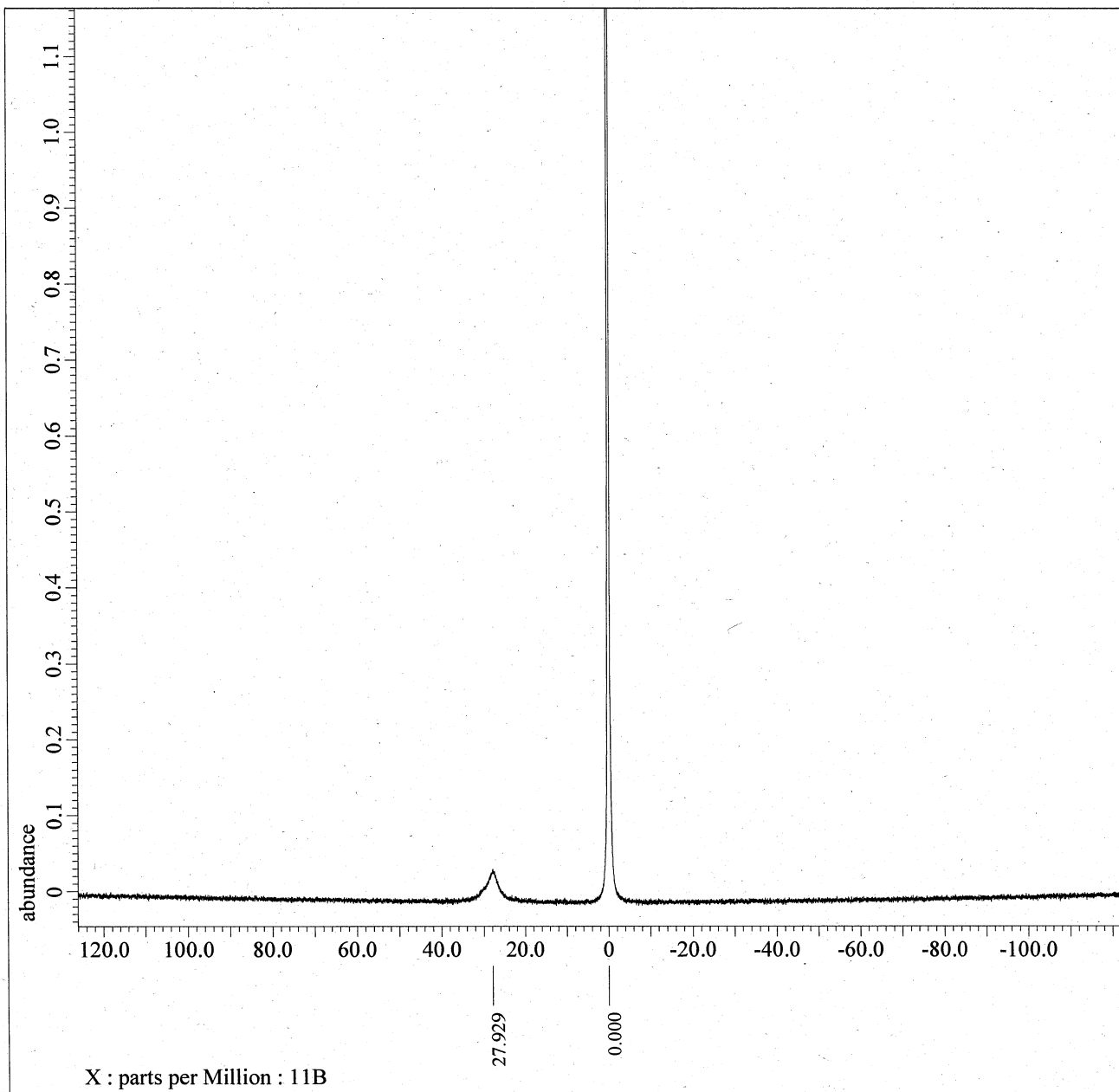
Comment = single pulse decoupl  
 Data\_Format = 1D COMPLEX  
 Dim\_Size = 26214  
 Dim\_Title = 11B  
 Dim\_Units = [ppm]  
 Dimensions = X  
 Site = ECX 400P  
 Spectrometer = DELTA2\_NMR

Field\_Strength = 9.2982153[T] (400[MH  
 X\_Acq\_Duration = 0.82313216[s]  
 X\_Domain = 11B  
 X\_Freq = 127.01553457[MHz]  
 X\_Offset = 0[ppm]  
 X\_Points = 32768  
 X\_Prescans = 4  
 X\_Resolution = 1.21487174[Hz]  
 X\_Sweep = 39.8089172[kHz]  
 Irr\_Domain = 1H  
 Irr\_Freq = 395.88430144[MHz]  
 Irr\_Offset = 5[ppm]  
 Clipped = FALSE  
 Scans = 256  
 Total\_Scans = 256

Relaxation\_Delay = 2[s]  
 Recvr\_Gain = 50  
 Temp\_Get = 23.8[dC]  
 X\_90\_Width = 10[us]  
 X\_Acq\_Time = 0.82313216[s]  
 X\_Angle = 30[deg]  
 X\_Atn = 4.8[dB]  
 X\_Pulse = 3.33333333[us]



(2)-3m



```

---- PROCESSING PARAMETERS ----
dc balance( 0, FALSE )
sexp( 2.0[Hz], 0.0[s] )
trapezoid3( 0[%], 80[%], 100[%] )
zerofill( 1 )
fft( 1, TRUE, TRUE )
machinephase
ppm

```

以下に由来: : PYD-134B-2.jdf

```

Filename      = PYD-134B-5.jdf
Author        = element
Experiment    = single_pulse_dec
Sample_Id     = S#577692
Solvent       = CHLOROFORM-D
Creation Time = 6-AUG-2018 15:49:46
Revision Time = 6-AUG-2018 16:26:26
Current Time  = 6-AUG-2018 16:26:43

```

```

Comment       = single pulse decoupl
Data Format    = 1D COMPLEX
Dim Size      = 26214
Dim Title     = 11B
Dim Units     = [ppm]
Dimensions    = X
Site          = ECX 400P
Spectrometer  = DELTA2_NMR

```

```

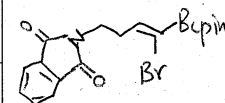
Field Strength = 9.2982153[T] (400[MH
X Acq Duration = 0.82313216[s]
X Domain       = 11B
X Freq         = 127.01553457[MHz]
X Offset       = 0[ppm]
X Points       = 32768
X Prescans     = 4
X Resolution   = 1.21487174[Hz]
X Sweep       = 39.8089172[kHz]
Irr Domain     = 1H
Irr Freq       = 395.88430144[MHz]
Irr Offset     = 5[ppm]
Clipped        = FALSE
Scans          = 256
Total Scans    = 256

```

```

Relaxation Delay = 2[s]
Recvr Gain       = 50
Temp_Get         = 23.8[dc]
X_90_Width      = 10[us]
X Acq Time       = 0.82313216[s]
X Angle          = 30[deg]
X_Atn           = 4.8[dB]
X_Pulse         = 3.33333333[us]

```



(2)-3n