Experimental:

Commercial reagents were used as received unless stated otherwise. The catalyst **1** was prepared according to published procedures.[1,2] ^{1}H NMR (300 or 500 MHz) and ^{13}C NMR (75 or 125 MHz) spectra were recorded in $CDCl_3$ on JEOL (Eclipse-500 and ECX-300 respectively) instruments. High resolution electrospray mass spectra were obtained at the University of Florida using an APEX II instrument (Bruker Daltonics, Billerica, MA).

Ethyl 2-bromo-4-pentenoate (15a)[3]

EDA (114 mg, 2.00 mmol) in allyl bromide 1.5 mL was added by automatic syringe over 1 h to a stirred solution of the catalyst (40 mg, 0.050 mmol) in the allyl bromide (1.5 mL) under nitrogen in a flask shielded from light. The resulting solution was stirred 24 h at ambient temperature under nitrogen. The solution was concentrated and the residue was purified by flash chromatography (SiO_2, 98:3 pentane/ether), yielding the product as a colorless oil (147 mg, 75%).

^{1}H NMR (500 MHz): δ = 1.29 (t, *J* = 7.1 Hz, 3H), 2.76-2.69 (m, 1H), 2.89-2.83 (m, 1H), 4.22 (t, *J* = 7.4 Hz, 1H), 4.24 (q, *J* = 7.1 Hz, 2H), 5.20-5.13 (m, 2H), 5.80-5.71 (m, 1H)

t-Butyl 2-bromo-4-pentenoate (15b)[3]

tert-Butyl diazoacetate (200 mg, 1.41 mmol) in the allyl bromide (1.5 mL) was added by automatic syringe over 1 h to a stirred solution of the catalyst (30 mg, 0.038 mmol) in the allyl bromide (1.5 mL) under nitrogen in a flask shielded from light. The resulting solution was stirred 24 h at ambient temperature under nitrogen. The solution was concentrated and the residue was purified by flash chromatography (SiO_2, 98:2 pentane/ether), yielding the product (215 mg, 65% yield) as a colorless oil.

IR (neat) cm^{-1} = 2980, 1735, 1641, 1456.

^{1}H NMR (500 MHz): δ = 1.46 (s, 9H), 2.64-2.69 (m, 1H), 2.78-2.84 (m, 1H), 4.12 (t, *J* = 7.0 Hz, 1H), 5.13-5.18 (m, 2H), 5.70-5.79 (m, 1H).

^{13}C NMR (125 MHz): δ = 28.2, 39.6, 46.5, 82.9, 119.3, 133.7, 168.8.

Ethyl 2-chloro-3-methyl-4-pentenoate (16a)[4]

Ethyl diazoacetate (218 mg, 2.00 mmol) in the crotyl chloride (1.5 mL) was added by automatic syringe over 1 h to a stirred solution of the catalyst (40 mg, 0.050 mmol) in the crotyl chloride (1.5 mL) under nitrogen in a flask shielded from light. The resulting solution was stirred 24 h at ambient temperature under nitrogen. The solution was concentrated and the residue was purified by flash chromatography (SiO_2, 98:6 pentane/ether), yielding the product (290 mg, 86% yield) as a colorless oil.

IR (neat) cm^{-1} = 2982, 1748, 1642, 1457.

^{1}H NMR (500 MHz): δ = 1.15 (d, *J* = 6.7 Hz, 1.5H), 1.16 (d, *J* = 6.7 Hz, 1.5H), 1.28 (t, *J* = 7.2 Hz, 1.5H), 1.30 (t, J = 7.2 Hz, 1.5 H), 2.82-2.90 (m, 1H), 4.26-4.15 (m, 3H), 5.17-5.11 (m, 2H), 5.87-5.72 (m, 1H), *syn/anti* ratio = 1/1.

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1. Dias, H. V. R.; Jin, W. *Inorg. Chem.* **1996**, *35*, 267-268.

2. Dias, H. V. R.; Wang, Z.; Jin, W. *Inorg. Chem.* **1997**, *36*, 6205-6215.

3. Stotter, P.L.; Hill, K.A. *Tetrahedron Lett.* **1972**, *40*, 4067-4074.

4. Doyle, M.P.; Tamblyn, W.H.; Bagheri, V. *J. Org. Chem*. **1981**, *46*, 5094-5102

^{13}C NMR (125 MHz): δ = 14.13, 14.17, 16.0, 17.3, 42.00, 42.04, 61.9, 62.0, 62.1, 62.3, 116.82, 116.89, 137.7, 138.3, 168.8, 168.9.

_t_-Butyl 2-chloro-3-methyl-4-pentenoate (16b)

tert-Butyl diazoacetate (166 mg, 1.17 mmol) in the crotyl chloride (1.5 mL) was added by automatic syringe over 1 h to a stirred solution of the catalyst (30 mg, 0.038 mmol) in the crotyl chloride (1.5 mL) under nitrogen in a flask shielded from light. The resulting solution was stirred 24 h at ambient temperature under nitrogen. The solution was concentrated and the residue was purified by flash chromatography (SiO_2, 98:6 pentane/ether), yielding the product (230 mg, 96% yield) as a colorless oil.

IR (neat, cm^{-1}): = 2980, 1744, 1643, 1457.

^{1}H NMR (500 MHz): δ = 1.12, 1.4 (d, J = 2.0 Hz, 3H), 1.46, 1.45 (s, 9H), 2.79 (m, 1H), 4.04, 4.07 (d, J = 6.5 Hz, 1H), 5.08-5.11 (m, 2H), 5.72-5.77 (m, 1H).

^{13}C NMR (125 MHz): δ = 16.0, 17.4, 27.92, 27.96, 42.00, 42.04, 63.1, 63.3, 82.6, 82.7, 116.6, 116.7, 137.9, 138.5, 167.8, 167.9.

Ethyl 2-chloro-4-methyl-4-pentenoate (17a)

Ethyl diazoacetate (218 mg, 2.00 mmol) in the 3-chloro-2-methylpropene (1.5 mL) was added by automatic syringe over 1 h to a stirred solution of the catalyst (40 mg, 0.050 mmol) in the 3-chloro-2-methylpropene (1.5 mL) under nitrogen in a flask shielded from light. The resulting solution was stirred 24 h at ambient temperature under nitrogen. The solution was concentrated and the residue was purified by flash chromatography (SiO_2, 98:3 pentane/Ether), yielding the product (200 mg, 59% yield) as a colorless oil.

IR (neat, cm^{-1}): = 2981, 2358, 1727, 1446, 1383.

^{1}H NMR (300 MHz): δ = 1.29 (m, 3H), 1.75 (s, 3H), 2.57 (dd, *J* = 3.0, 16.5 Hz, 1H), 2.75 (dd, *J* = 3.0, 16.5 Hz, 1H), 4.22 (m, 2H), 4.38 (m, 1H), 4.80 (s, 1H), 4.88 (s, 1H).

^{13}C NMR (75 MHz): δ = 14.1, 22.1, 42.9, 55.0, 62.1, 114.4 139.9, 169.5.

HRMS (ESI): calcd for $C_8H_{14}ClO_2$ $(M+H)^+$ 177.0678, found 177.0674.

_t_-Butyl 2-chloro-4-methyl-4-pentenoate (17b)

tert-Butyl diazoacetate (165 mg, 1.16 mmol) in the 3-chloro-2-methylpropene (1.5 mL) was added by automatic syringe over 1 h to a stirred solution of the catalyst (30 mg, 0.038 mmol) in 3-chloro-2-methylpropene (1.5 mL) under nitrogen in a flask shielded from light. The resulting solution was stirred 24 h at ambient temperature under nitrogen. The solution was concentrated and the residue was purified by flash chromatography (SiO_2, 98:3 pentane/ether), yielding the product (200 mg, 84% yield) as a colorless oil.

IR (neat, cm^{-1}) = 2982, 1744, 1652, 1455, 1395.

^{1}H NMR (500 MHz): δ = 1.45 (s, 9H), 1.74 (s, 3H), 2.52 (dd, *J* = 7.3, 14.7 Hz, 1H), 2.71 (dd, *J* = 7.3 and 14.7 Hz, 1H), 4.25 (t, *J* = 7.3 Hz, 1H), 4.78 (s, 1H), 4.85 (s, 1H).

^{13}C NMR (125 MHz): δ = 22.1, 27.8, 43.0, 56.0, 82.6, 114.2, 140.2, 168.5.

HRMS (ESI): calcd for $C_{10}H_{18}ClO_2$ $(M+H)^+$ 205.0990, found 205.0989.

Ethyl 2-bromo-4-methyl-4-pentenoate (18a)

Ethyl diazoacetate (218 mg, 2.00 mmol) in the 3-bromo-2-methylpropene (1.5 mL) was added by automatic syringe over 1 h to a stirred solution of the catalyst (40 mg, 0.050 mmol) in the 3-bromo-2-methylpropene (1.5 mL) under nitrogen in a flask shielded from light. The resulting solution was stirred 24 h at ambient temperature under nitrogen. The

solution was concentrated and the residue was purified by flash chromatography (SiO_2, 97:3 pentane/ether), yielding the product (240 mg, 57% yield) as a colorless oil.

IR (neat, cm^{-1}): = 2925, 2854, 1741, 1457.

^1H NMR (300 MHz): δ = 1.29 (t, *J* = 7.2 Hz, 3H), 1.74 (s, 3H), 2.65 (dd, *J* = 7.2, 15.0 Hz, 1H), 2.85 (dd, *J* = 8.1, 14.7 Hz, 1H), 4.22 (q, *J* = 7.2 Hz, 2H), 4.34 (dd, *J* = 7.2, 8.4 Hz, 1H), 4.78 (s, 1H), 4.88 (s, 1H).

^{13}C NMR (75 MHz) δ = 14.0, 22.2, 42.8, 43.6, 62.0, 114.1, 140.8, 169.6.

HRMS (ESI): calcd for $C_8H_{14}BrO_2$ $(M+H)^+$ 221.0172, found 221.0174.

_t_-Butyl 2-bromo-4-methyl-4-pentenoate (18b)

tert-Butyl diazoacetate (166 mg, 1.17 mmol) in the 3-bromo-2-methylpropene (1.5 mL) was added by automatic syringe over 1 h to a stirred solution of the catalyst (30 mg, 0.038 mmol) in the 3-bromo-2-methylpropene (1.5 mL) under nitrogen in a flask shielded from light. The resulting solution was stirred 24 h at ambient temperature under nitrogen. The solution was concentrated and the residue was purified by flash chromatography (SiO_2, 97:3 pentane/ether), yielding the product (260 mg, 89% yield) as a colorless oil.

IR (neat, cm^{-1}): = 3081, 2980, 1743, 1651, 1455, 1394.

^1H NMR (500 MHz): δ = 1.48 (s, 9H), 1.77 (s, 3H), 2.55 (dd, *J* = 7.5, 14.5 Hz, 1H), 2.74 (dd, *J* = 7.5, 14.5 Hz, 1H), 4.28 (t, *J* = 8.0 Hz, 1H), 4.81 (s, 1H), 4.88 (s, 1H).

^{13}C NMR (125 MHz): δ = 22.2, 27.9, 43.1, 56.1, 82.6, 114.3, 140.2, 168.5.

Ethyl 2-bromo-3-bromomethyl-4-pentenoate (19a)

Ethyl diazoacetate (218 mg, 2.00 mmol) and 1,4-dibromo-2-butene (1.00 g), dissolved in dichloromethane (1 mL) was added by automatic syringe over 1 h to a stirred solution of the catalyst (40 mg, 0.050 mmol) and 1,4-dibromo-2-butene (1.00 g) in dichloromethane (1 mL) under nitrogen in a flask shielded from light. The resulting solution was stirred 24 h at ambient temperature under nitrogen. The solution was concentrated and the residue was purified by flash chromatography (SiO_2, 98:3 pentane/ether), yielding the product as a colorless oil (400 mg, 70% yield).

IR (neat, cm^{-1}): = 2983, 2359, 1740, 1370.

^1H NMR (300 MHz): δ = 1.25-1.27 (m, 3H), 2.98-3.01 (m, 1H), 3.48-3.49 (m, 1H), 3.61-3.66, 3.72-3.78 (m, 1H), 4.14-4.25 (m, 2H), 4.30, 4.70 (dd, *J* = 3.0, 16.5 Hz, 1H), 5.26-5.27 (m, 2H), 5.71-5.74 (m, 1H), *syn/anti* ratio = 1/1.

^{13}C NMR (75 MHz): δ = 14.0, 14.3, 34.3, 36.0, 47.61, 47.64, 48.4, 50.0, 62.1, 62.5, 120.4, 120.9, 133.7, 134.0, 168.1, 168.4.

HRMS (ESI): calcd for $C_8H_{13}Br_2O_2$ $(M+H)^+$ 300.9261, found 300.9260.

_t_-Butyl 2-bromo-3-bromomethyl-4-pentenoate (19b)

tert-Butyl diazoacetate (130 mg, 0.915 mmol) and 1,4-dibromo-2-butene (1.00 g), dissolved in dichloromethane (1 mL) was added by automatic syringe over 1 h to a stirred solution of the catalyst (30 mg, 0.038 mmol) and 1,4-dibromo-2-butene (1.00 g) in dichloromethane (1 mL) under nitrogen in a flask shielded from light. The resulting solution was stirred 24 h at ambient temperature under nitrogen. The solution was concentrated and the residue was purified by flash chromatography (SiO_2, 98:3 pentane/ether), yielding the product (260 mg, 87% yield) as a colorless oil.

IR (neat, cm^{-1}): = 2979, 1734, 1476, 1426.

^{1}H NMR (500 MHz) δ = 1.44, 1.46 (s, 9H), 2.92-3.00 (m, 1H), 3.5 (m, 1H), 3.64 (dd , *J* = 3.2, 10.0 Hz), 3.75 (dd , *J* = 5.3, 10.0 Hz, 1H), 4.2 (d, *J* = 9.9 Hz), 4.61 (d, *J* = 5.2 Hz, 1H), 5.25-5.29 (m, 2H), 5.71-5.75 (m, 1H), *syn/anti* ratio = 1/1.

^{13}C NMR (75 MHz): δ = 27.8, 27.9, 34.5, 36.3, 47.6, 48.6, 49.2, 51.4, 82.9, 83.3, 120.2, 120.8, 133.8, 134.2, 167.0, 167.4.

HRMS (ESI): calcd for $C_{10}H_{16}Br_2O_2Na$ $(M+Na)^+$ 350.9394, found 350.9396.

tert-Butyl 2-bromo-3,4-pentadienoate (23b)

tert-Butyl diazoacetate (166 mg, 1.17 mmol) in distilled propargyl bromide (1.5 mL) was added by automatic syringe over 1 h to a stirred solution of the catalyst (30 mg, 0.038mmol) in the propargyl bromide (1.5 mL) under nitrogen in a flask shielded from light. The resulting solution was stirred 24 h at ambient temperature under nitrogen. The solution was concentrated and the residue was purified by flash chromatography (SiO_2, 98:2 pentane/ether), yielding the product as a colorless oil (180 mg, 66% yield).

IR (neat, cm^{-1}): = 2979, 1951, 1734, 1369.

^{1}H NMR (500 MHz): δ = 1.48 (s, 9H), 4.60 (dt, *J* = 6.5, 10.0 Hz, 1H), 4.73 (d, *J* = 9.5 Hz, 1H), 4.96 (d, *J* = 6.5 Hz, 1H), 4.97 (d, *J* = 6.5 Hz, 1H)

^{13}C NMR (125 MHz): δ = 27.8, 44.6, 78.3, 83.0, 89.6, 167.0, 209.2.

HRMS (ESI): calcd for $C_9H_{13}BrO_2Na$ $(M+Na)^+$ 254.991, found 254.991.

Ethyl 2-bromo-3-ethyl-3,4-pentadienoate (24a)

EDA (218 mg, 2.00 mmol) in the 1-bromo-2-pentyne (1.5 mL) was added by automatic syringe over 1 h to a stirred solution of the catalyst (40 mg, 0.050 mmol) in the 1-bromo-2-pentyne (1.5 mL) under nitrogen in a flask shielded from light. The resulting solution was stirred 24 h at ambient temperature under nitrogen. The solution was concentrated and the residue was purified by flash chromatography (SiO_2, 94:6 pentane/ether), yielding the product (316 mg, 71% yield) as a colorless oil.

IR (neat, cm^{-1}): = 2974, 2935, 1951, 1744, 1456.

^{1}H NMR (500 MHz): δ = 1.16 (m, 3H), 0.92 (m, 3H), 2.00-2.14 (m, 2H), 4.06-4.16 (m, 2H), 4.74-4.86 (m, 3H)

^{13} C NMR (75 MHz): δ = 11.9, 14.1, 21.8, 48.9, 62.3, 79.4, 103.5, 168.2, 206.8.

HRMS (ESI): calcd for $C_9H_{14}BrO_2$ $(M+H)^+$ 233.0172, found 233.0174.

tert-Butyl 2-bromo-3-ethyl-3,4-pentadienoate (24a)

tert-Butyl diazoacetate (176 mg, 1.24 mmol) in the 1-bromo-2-pentyne 1.5 mL was added by automatic syringe over 1 h to a stirred solution of the catalyst (30 mg, 0.038 mmol) in the 1-bromo-2-pentyne (1.5 mL) under nitrogen in a flask shielded from light. The resulting solution was stirred 24 h at ambient temperature under nitrogen. The solution was concentrated and the residue was purified by flash chromatography (SiO_2, 94:6 pentane/ether), yielding the product as a colorless oil (240 mg, 74% yield).

IR (neat, cm^{-1}): = 2975, 2935, 1951, 1742, 1457, 1369.

^{1}H NMR (300 MHz): δ = 1.03 (t, *J* = 7.5 Hz, 3H), 1.46 (s, 9H), 2.17 (m, 2H), 4.81 (s, 1H), 4.89 (m, 2H)

^{13}C NMR (75 MHz): δ = 11.9, 21.9, 27.9, 50.2, 79.3, 82.9, 103.4, 166.4, 206.6.

HRMS (ESI): calcd for $C_{22}H_{34}Br_2O_4Na$ $(2M+Na)^+$ 545.0706, found 545.0713.

tert-Butyl 2-chloro-4-hexenoate (26)

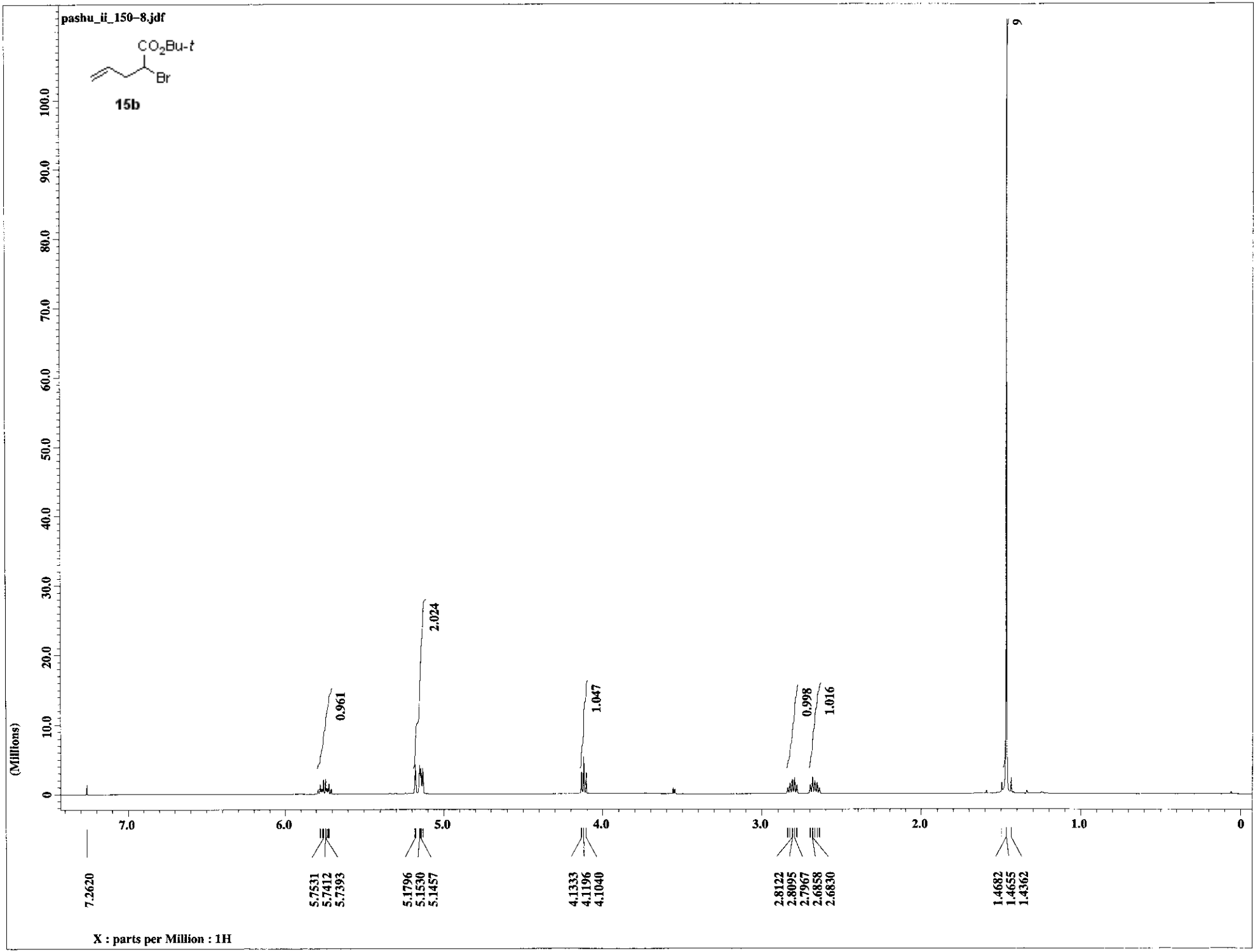
tert-Butyl diazoacetate (166 mg, 1.17 mmol) in 3-chloro-1-butene (1.5 mL) was added by automatic syringe over 1 h to a stirred solution of the catalyst (30 mg, 0.038mmol) in the 3-chloro-1-butene (1.5 mL) under nitrogen in a flask shielded from light. The resulting solution was stirred 24 h at ambient temperature under nitrogen. The solution was concentrated and the residue was purified by flash chromatography (SiO_2, 19:1 hexane/dichloromethane), yielding the product as a colorless oil (77% yield, 184 mg).

IR (neat, cm^{-1}): = 2977, 1740, 1464, 1426.

^1H NMR (300 MHz): δ = 5.59 (m, 1H), 5.39 (m, 1H), 4.13 (t, J = 6.9 Hz, 1H), 2.50-2.70 (m, 2H), 1.682 (m, 3H), 1.47 (s, 9H).

^{13}C NMR (75 MHz): δ = 168.4, 130.0, 124.8, 82.5, 57.9, 38.4, 27.9, 18.0.

HRMS (ESI): calcd for $C_{10}H_{18}ClO_2$ $(M+H)^+$ 205.0990, found 205.0983.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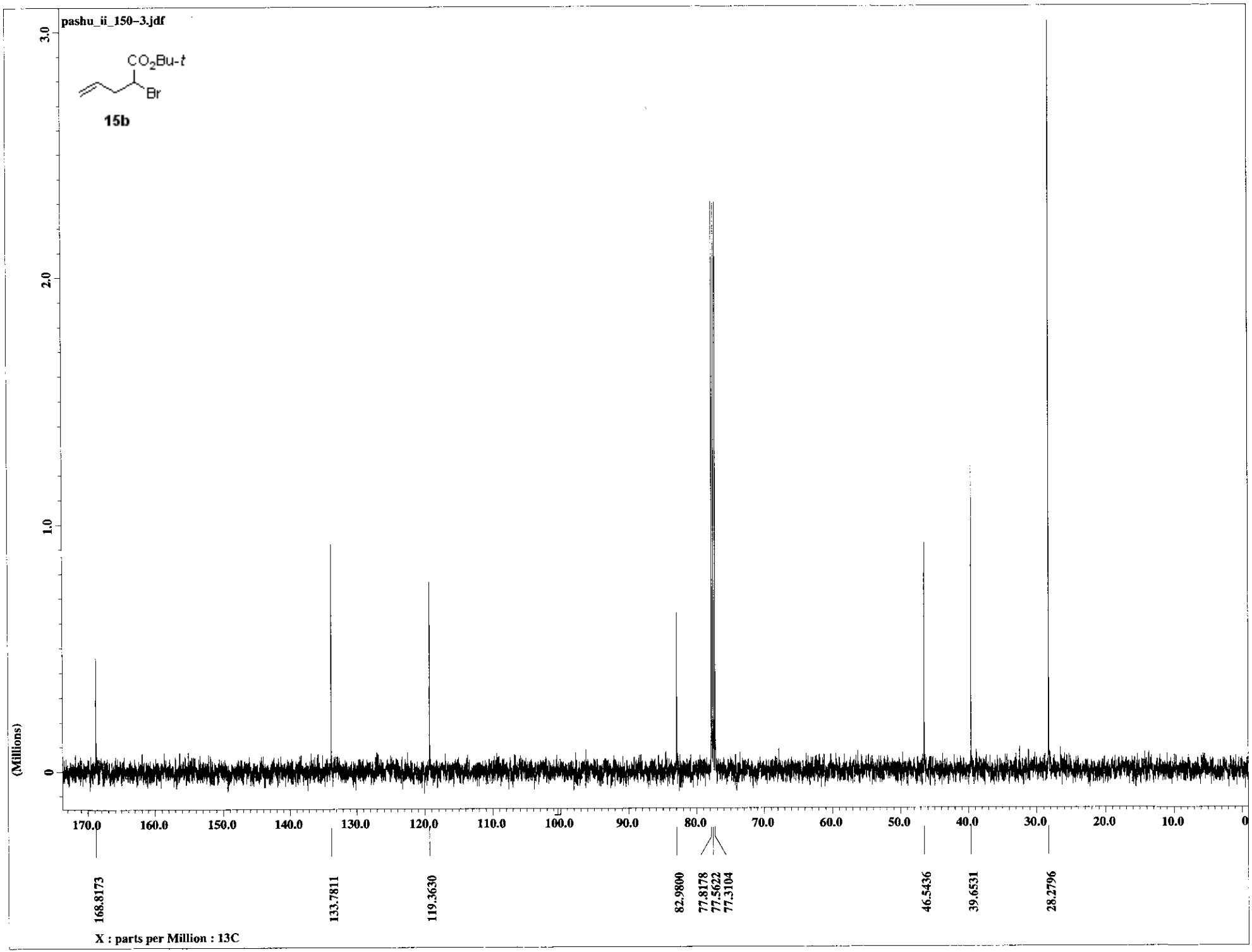
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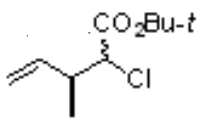
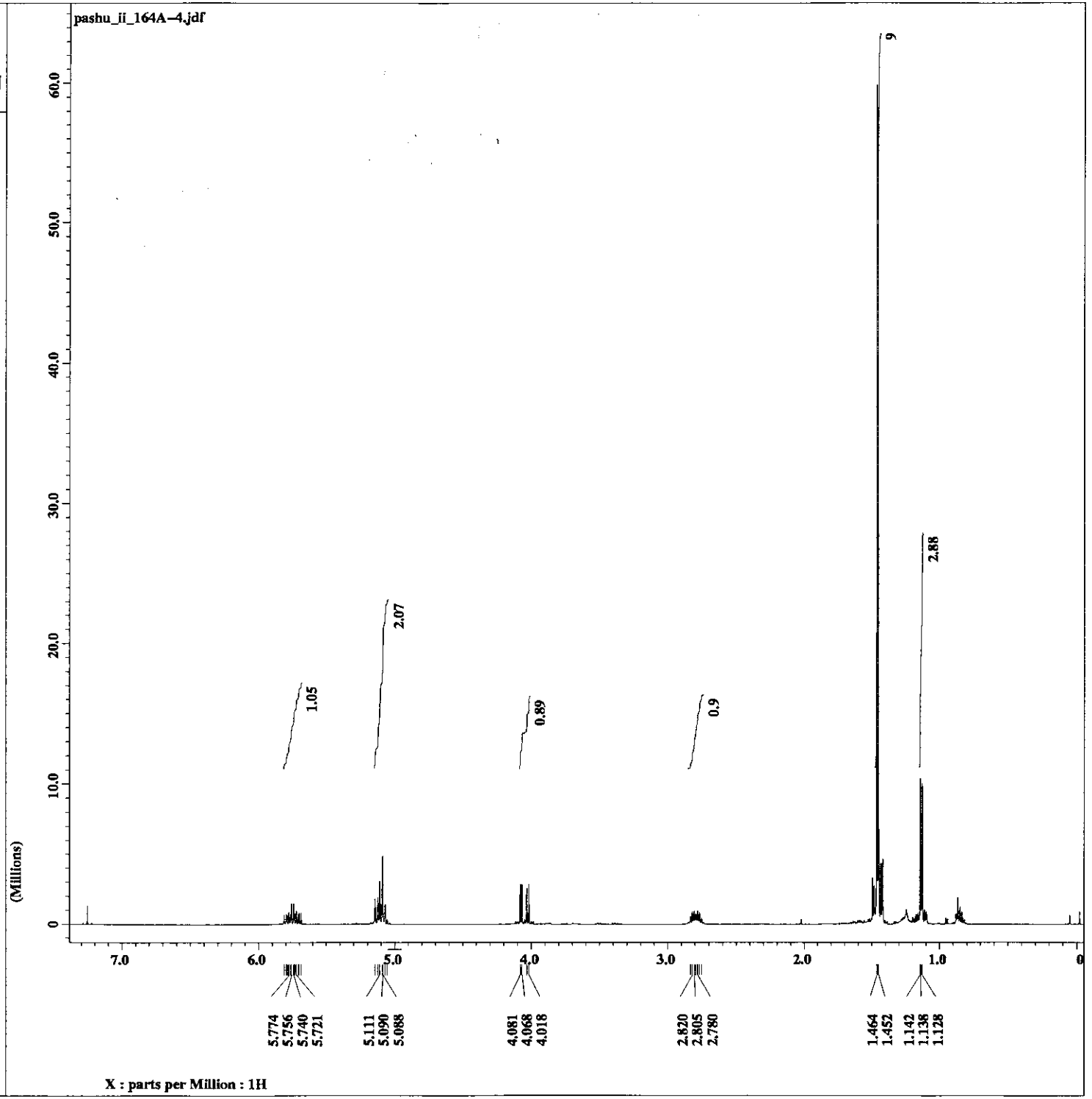
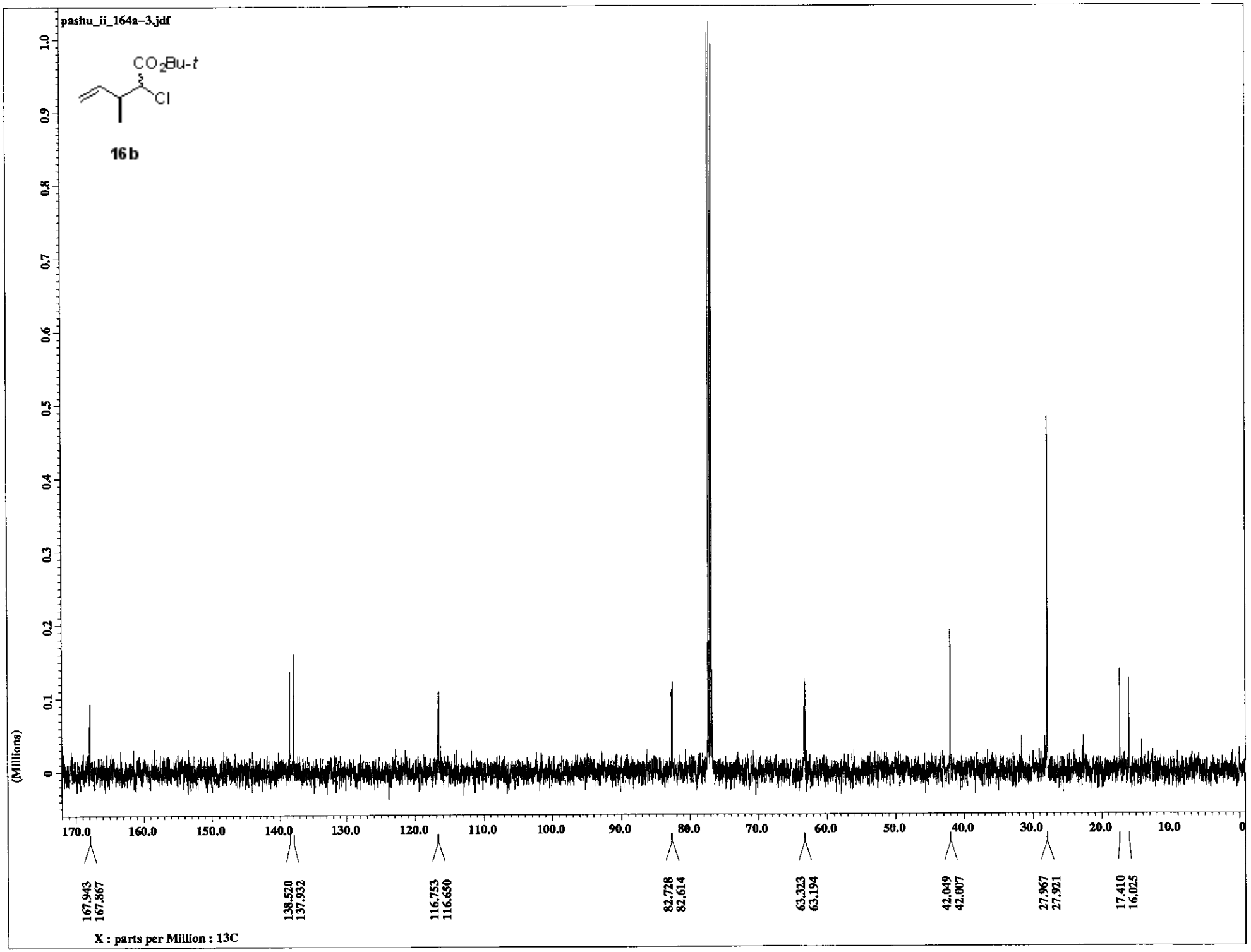


16b

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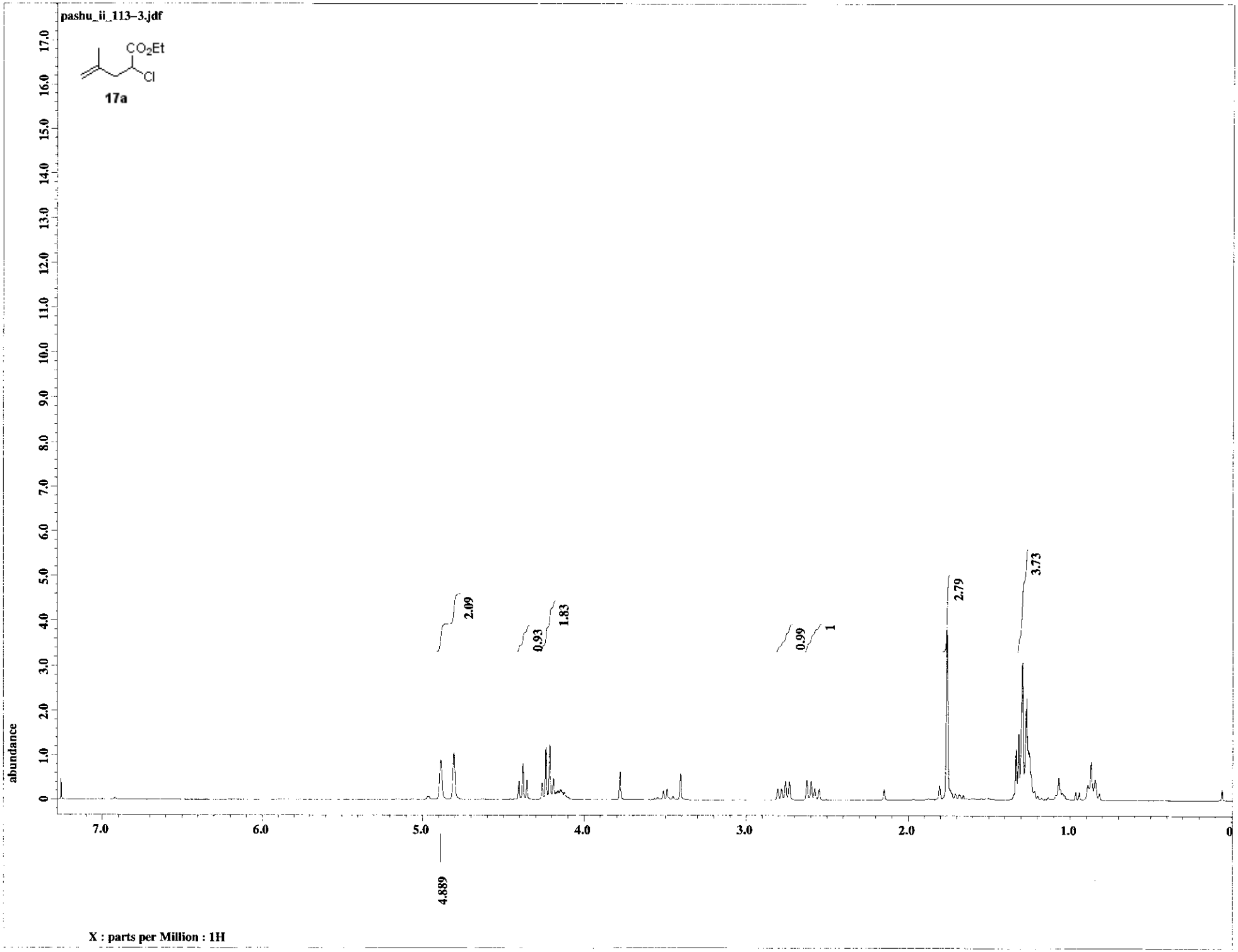
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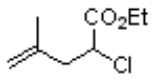
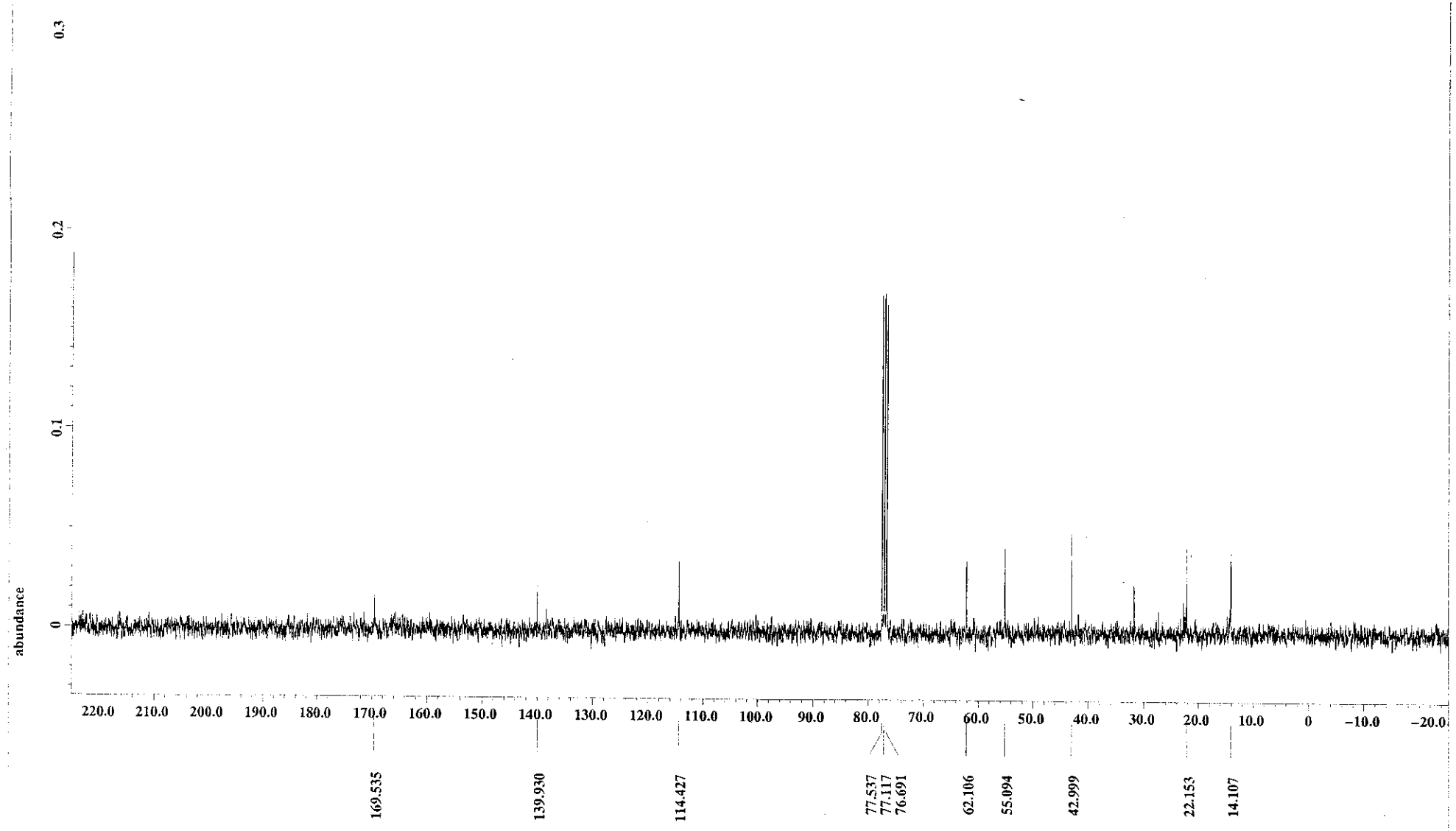
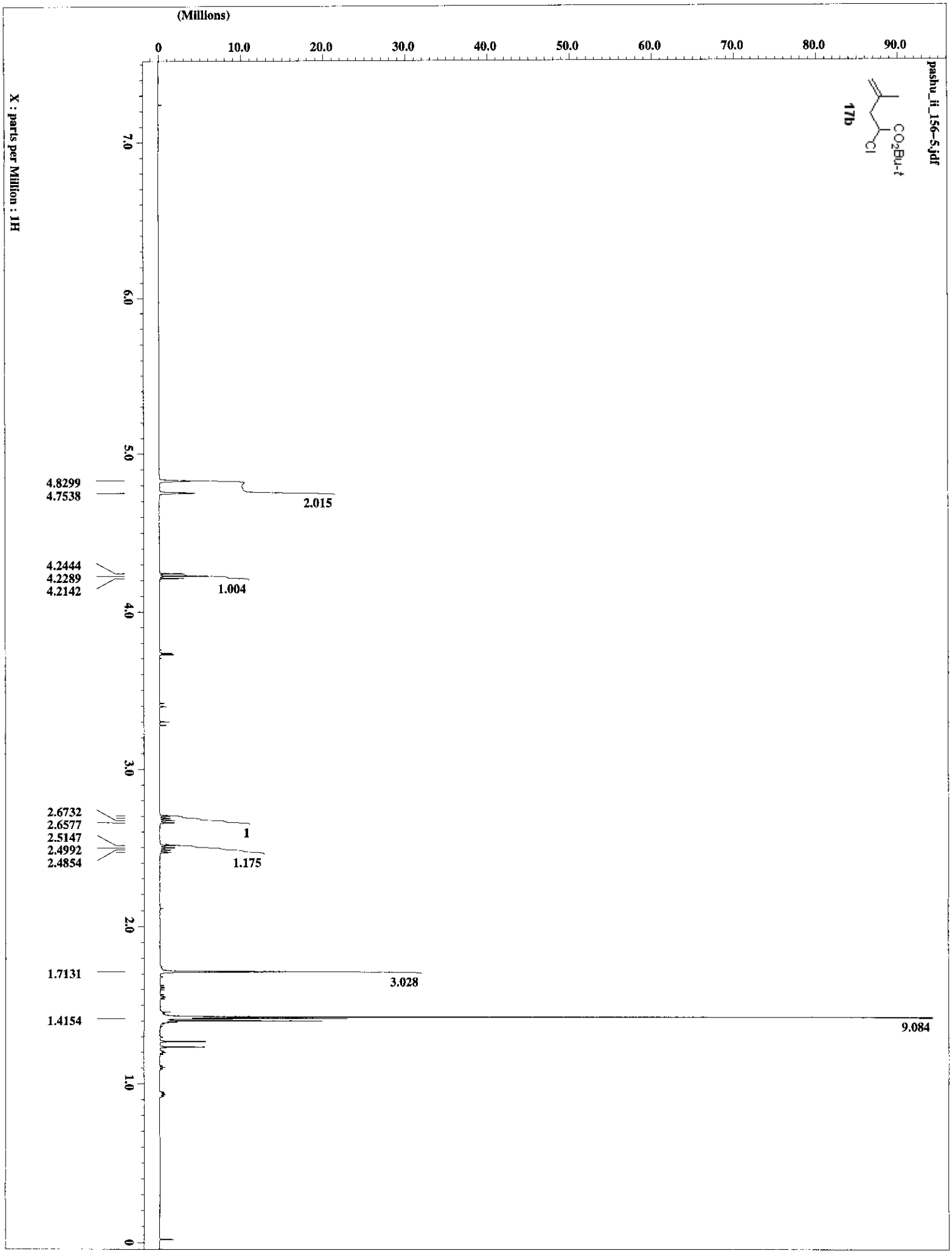


17a

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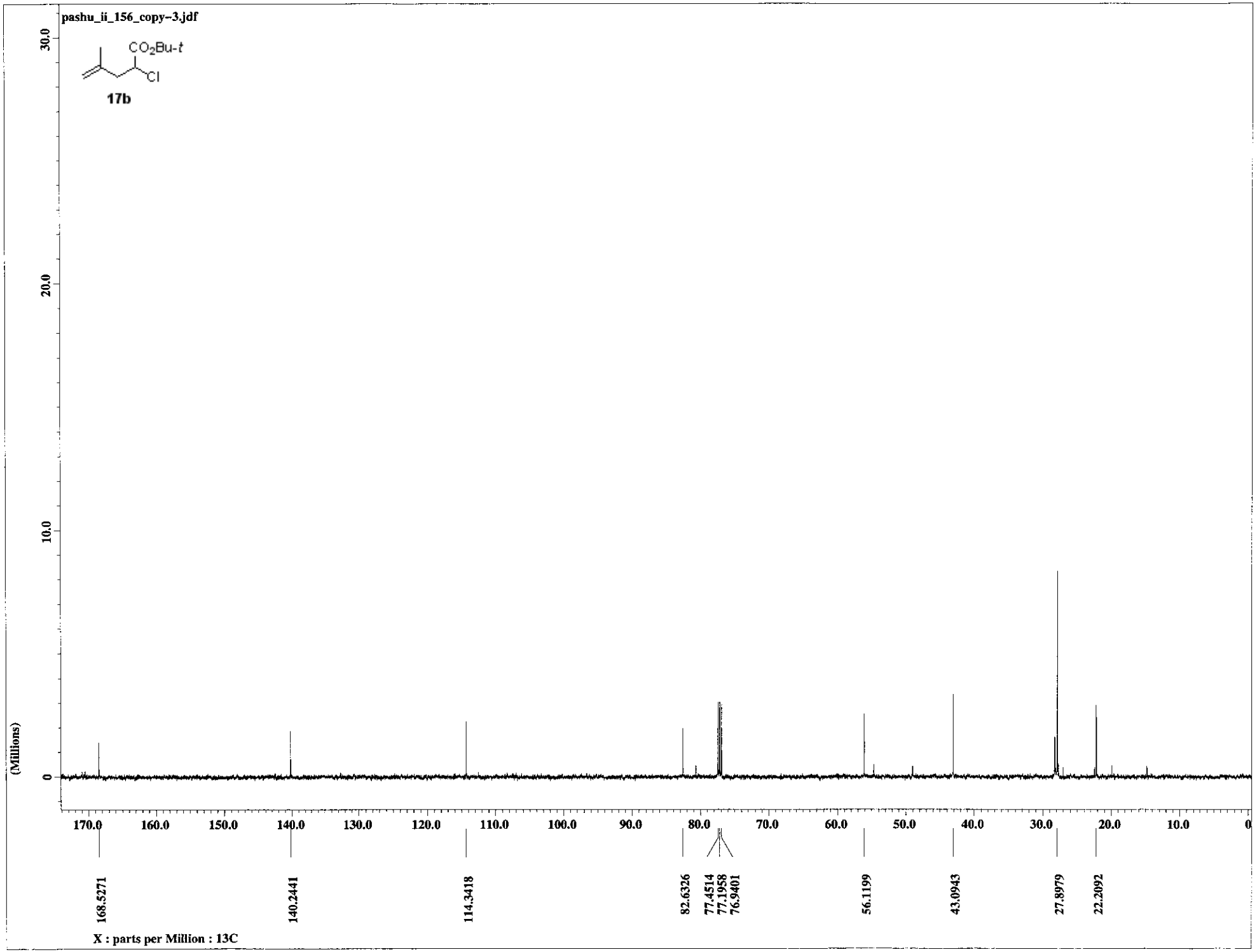
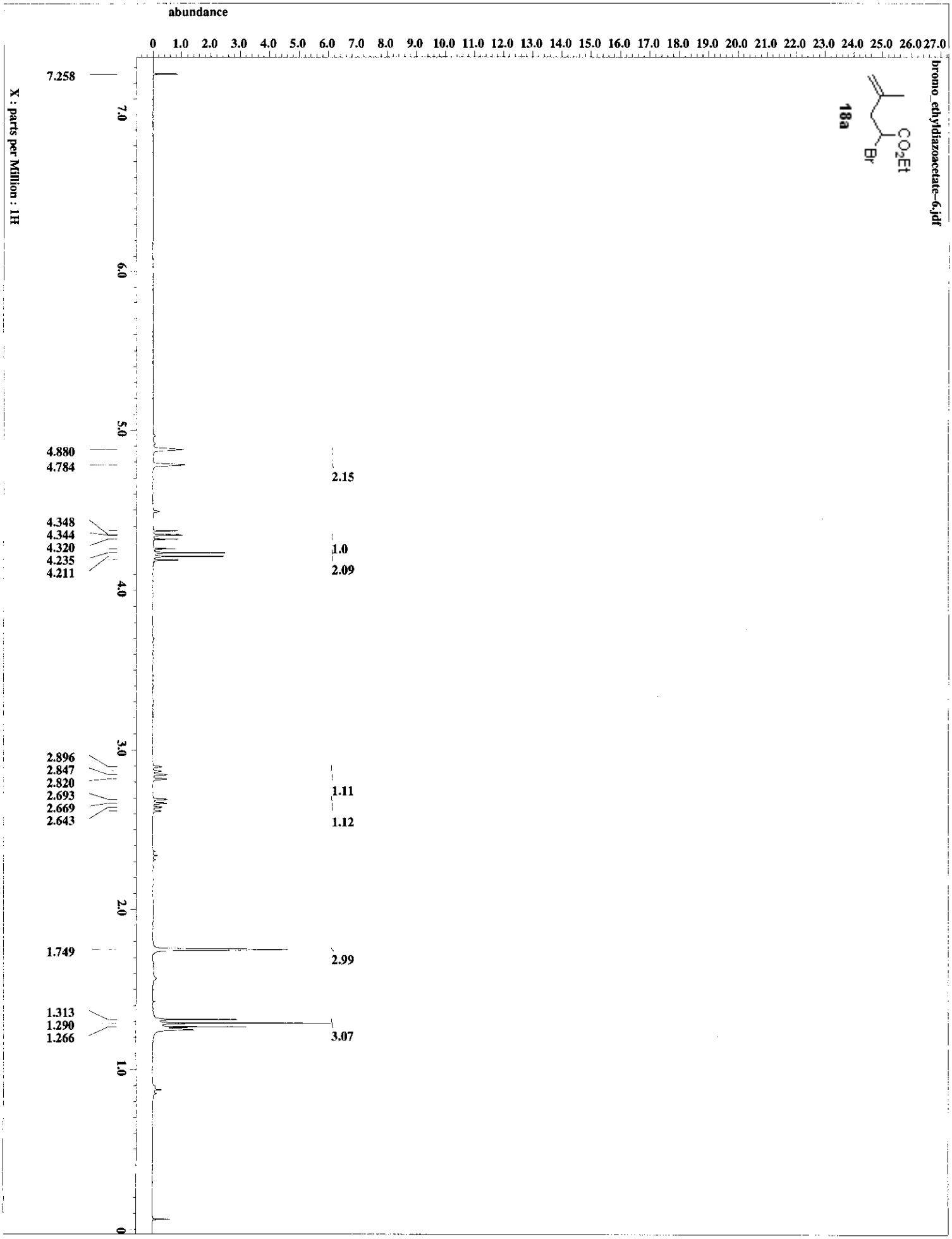
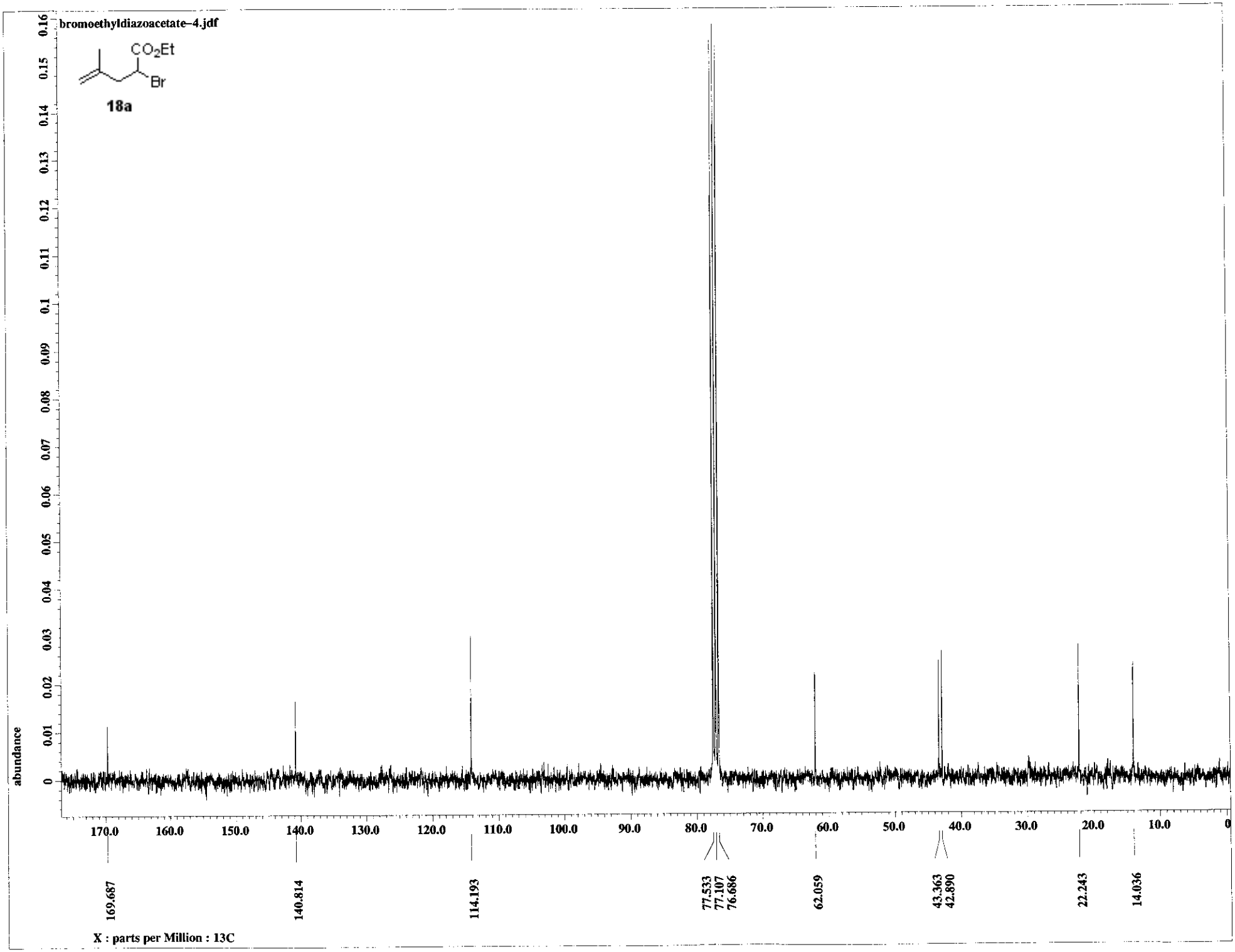
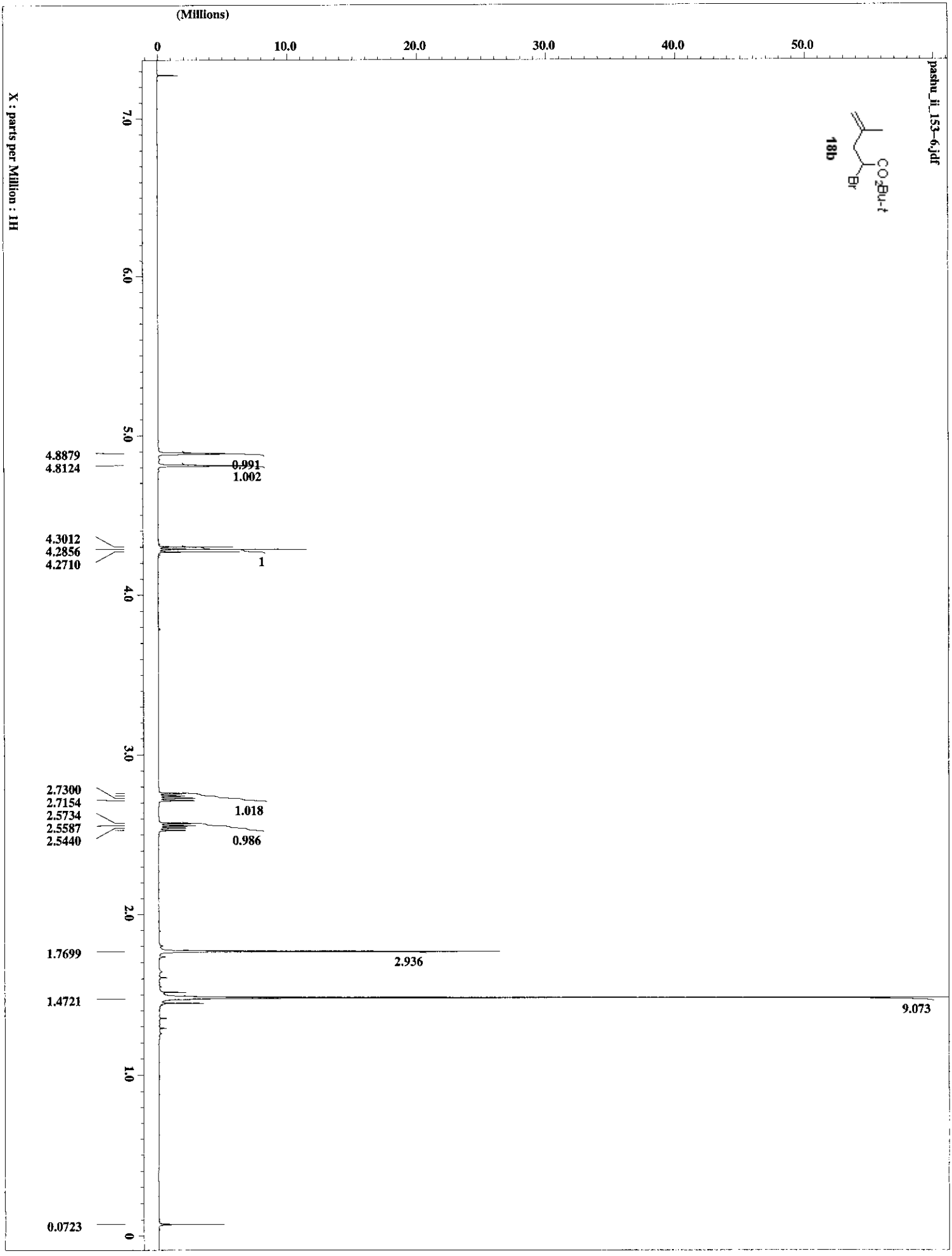
CO2Bu-t
Cl
X : parts per Million : 1H
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0
4.8299
4.7538
2.015
4.2444
4.2289
4.2142
1.004
2.6732
2.6577
2.5147
2.4992
2.4854
1
1.175
1.7131
3.028
1.4154
9.084

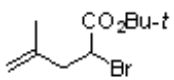

pashu_ii_156_copy--3.jdf
CO2Bu-t
Cl
17b
30.0
20.0
10.0
0
(Millions)
170.0
160.0
150.0
140.0
130.0
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
168.5271
140.2441
114.3418
82.6326
77.4514
77.1958
76.9401
56.1199
43.0943
27.8979
22.2092
X : parts per Million : 13C


abundance
0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0 16.0 17.0 18.0 19.0 20.0 21.0 22.0 23.0 24.0 25.0 26.0 27.0
bromo_ethyldiazoacetate-6.jdf
18a
CO2Et
Br
X : parts per Million : 1H
7.258
4.880
4.784
4.348
4.344
4.320
4.235
4.211
2.896
2.847
2.820
2.693
2.669
2.643
1.749
1.313
1.290
1.266
2.15
1.0
2.09
1.11
1.12
2.99
3.07
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0

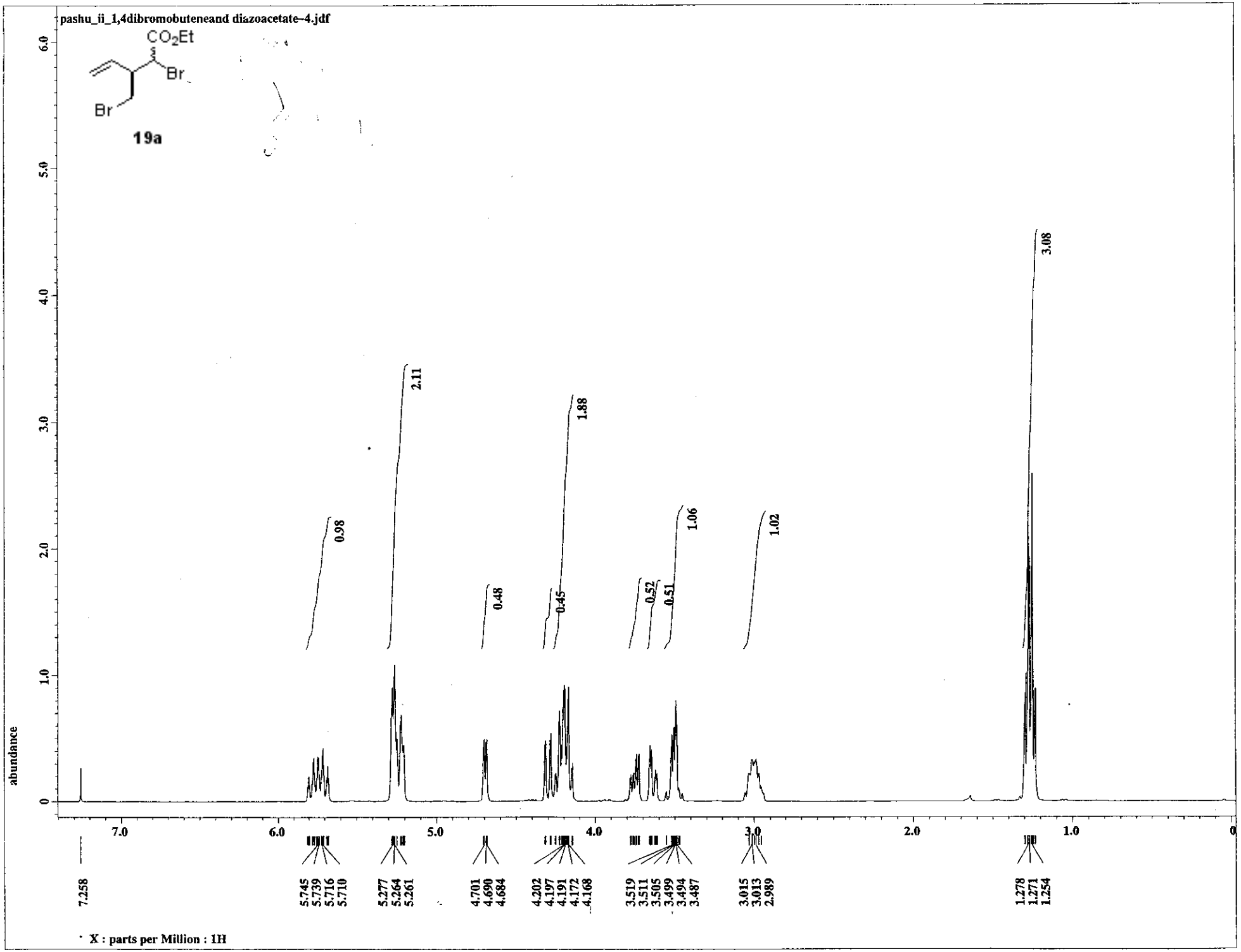

bromoethyldiazoacetate-4.jdf
CO2Et
Br
18a
abundance
0.16
0.15
0.14
0.13
0.12
0.11
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
170.0
160.0
150.0
140.0
130.0
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
169.687
140.814
114.193
77.533
77.107
76.686
62.059
43.363
42.890
22.243
14.036
X : parts per Million : 13C

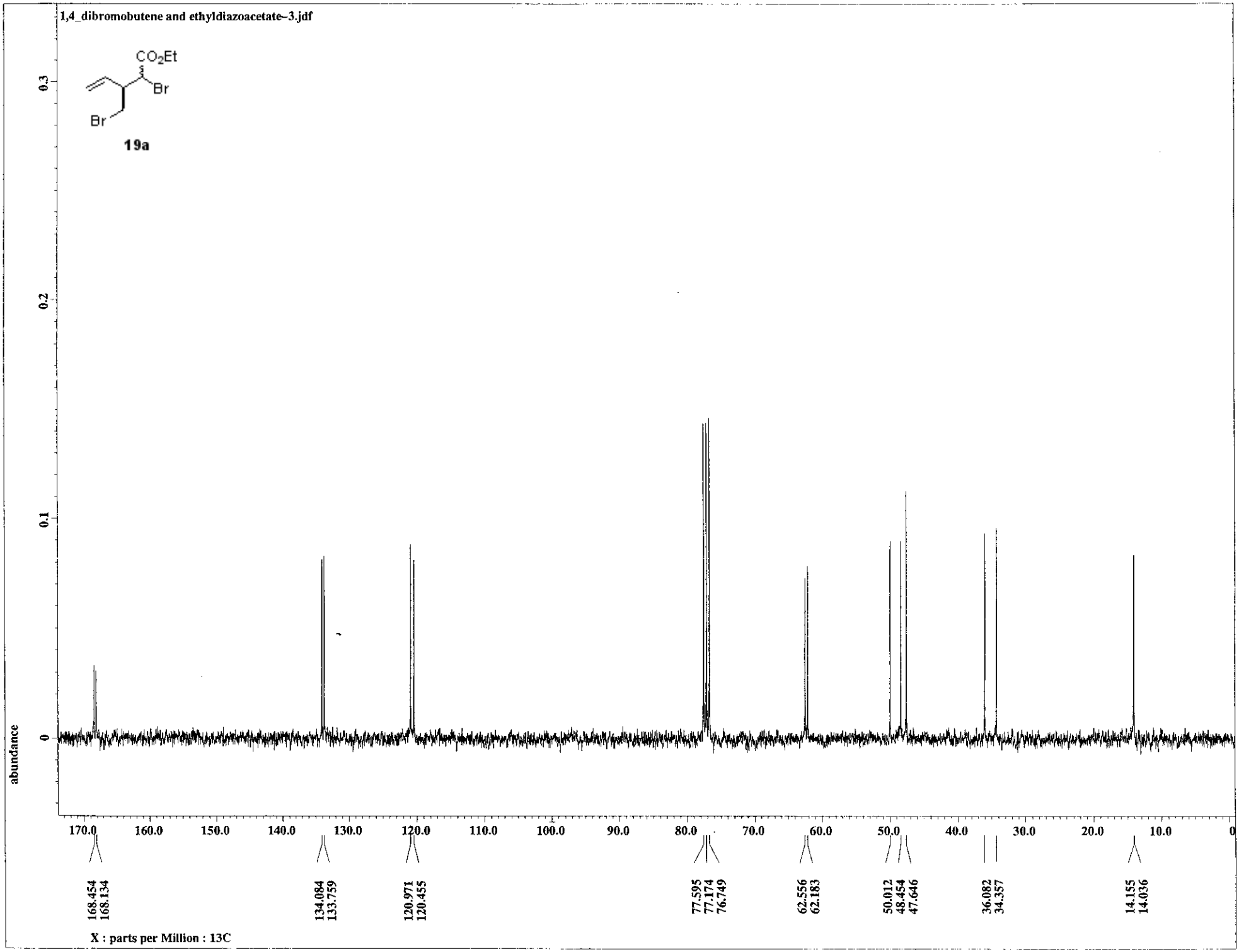

(Millions)
0
10.0
20.0
30.0
40.0
50.0
pashu_ii_153-6.jdf
X : parts per Million : 1H
18b
CO2Bu-t
Br
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0
4.8879
4.8124
0.991
1.002
4.3012
4.2856
4.2710
1
2.7300
2.7154
2.5734
2.5587
2.5440
1.018
0.986
1.7699
2.936
1.4721
9.073
0.0723

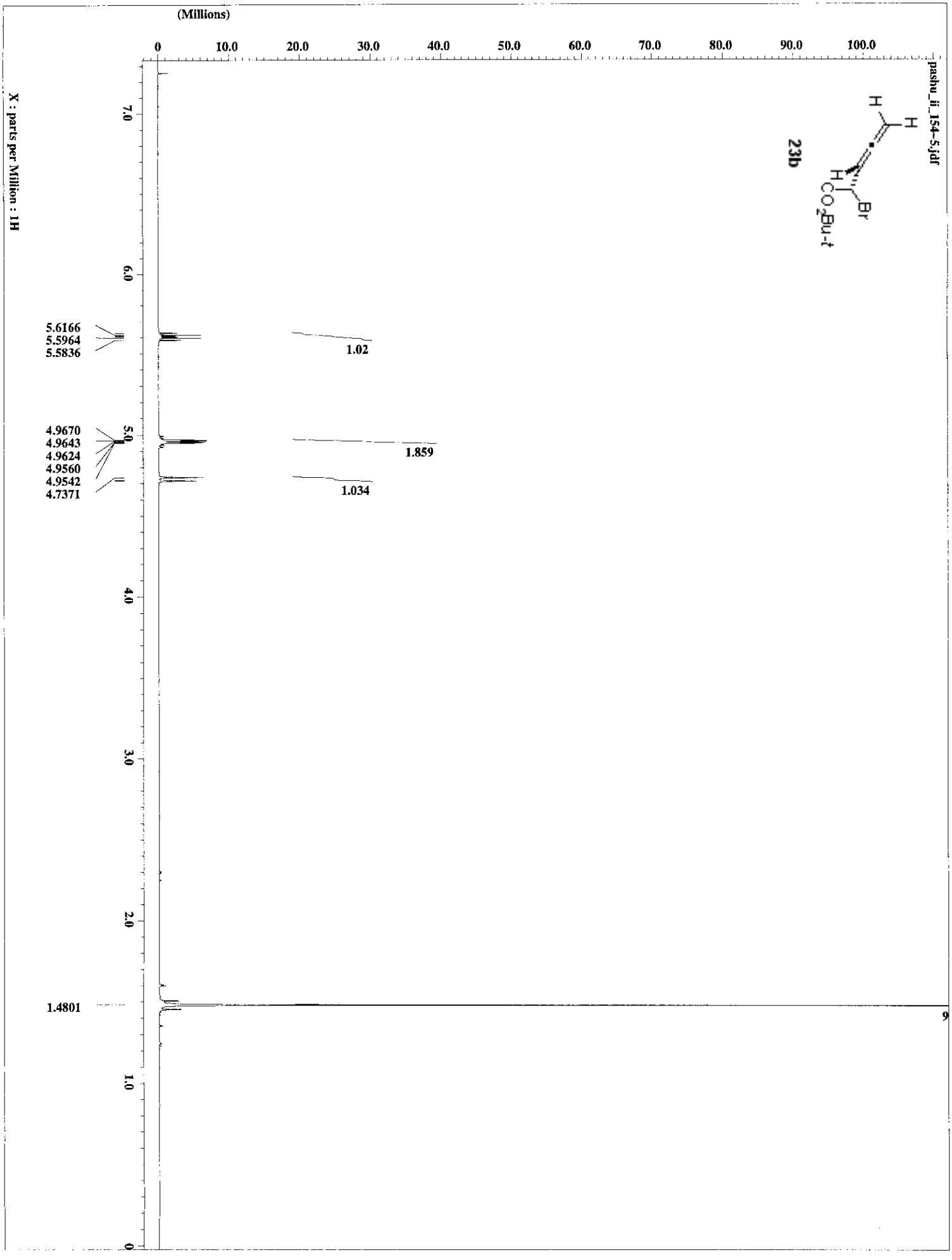
pashu_ii_153–4.jdf

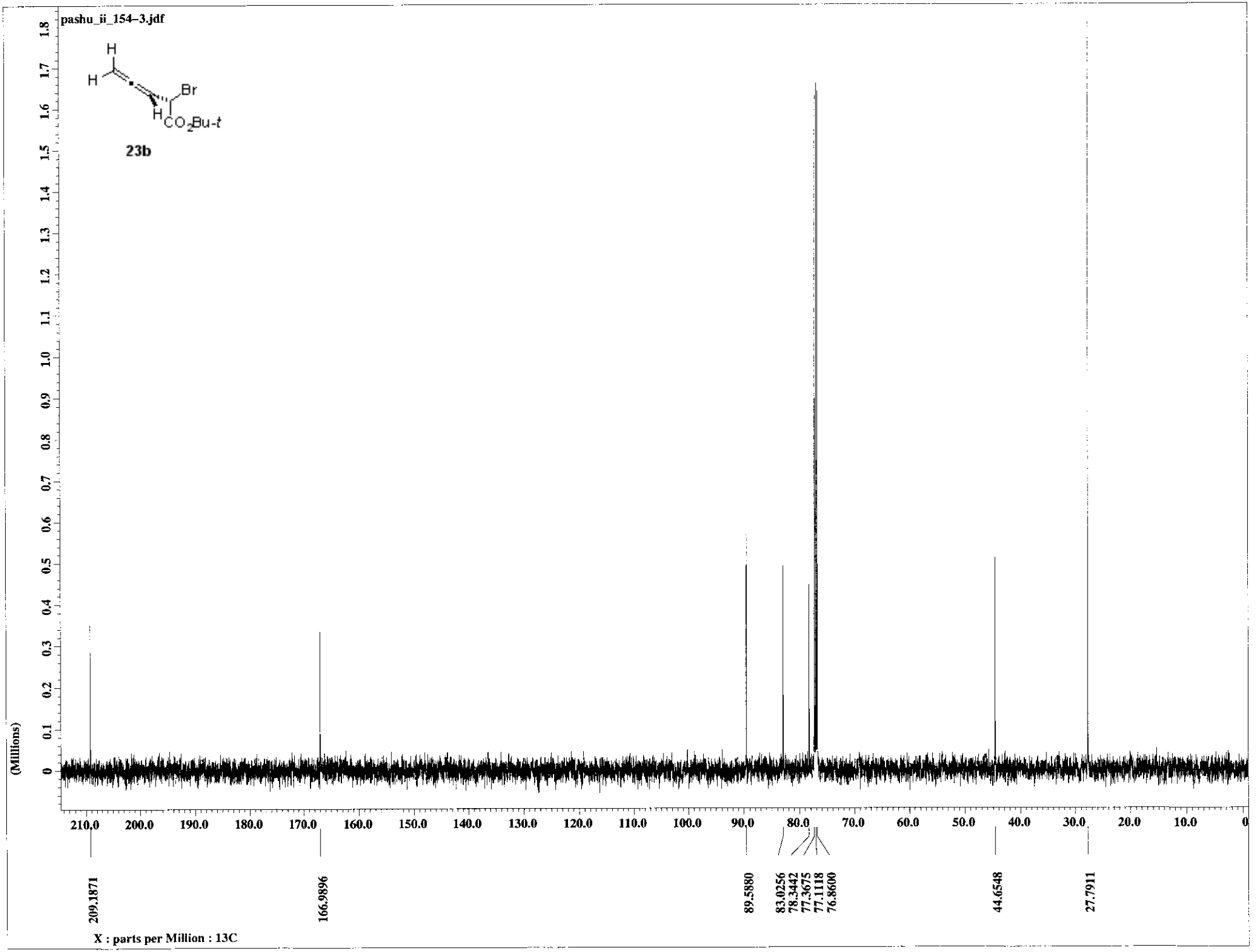


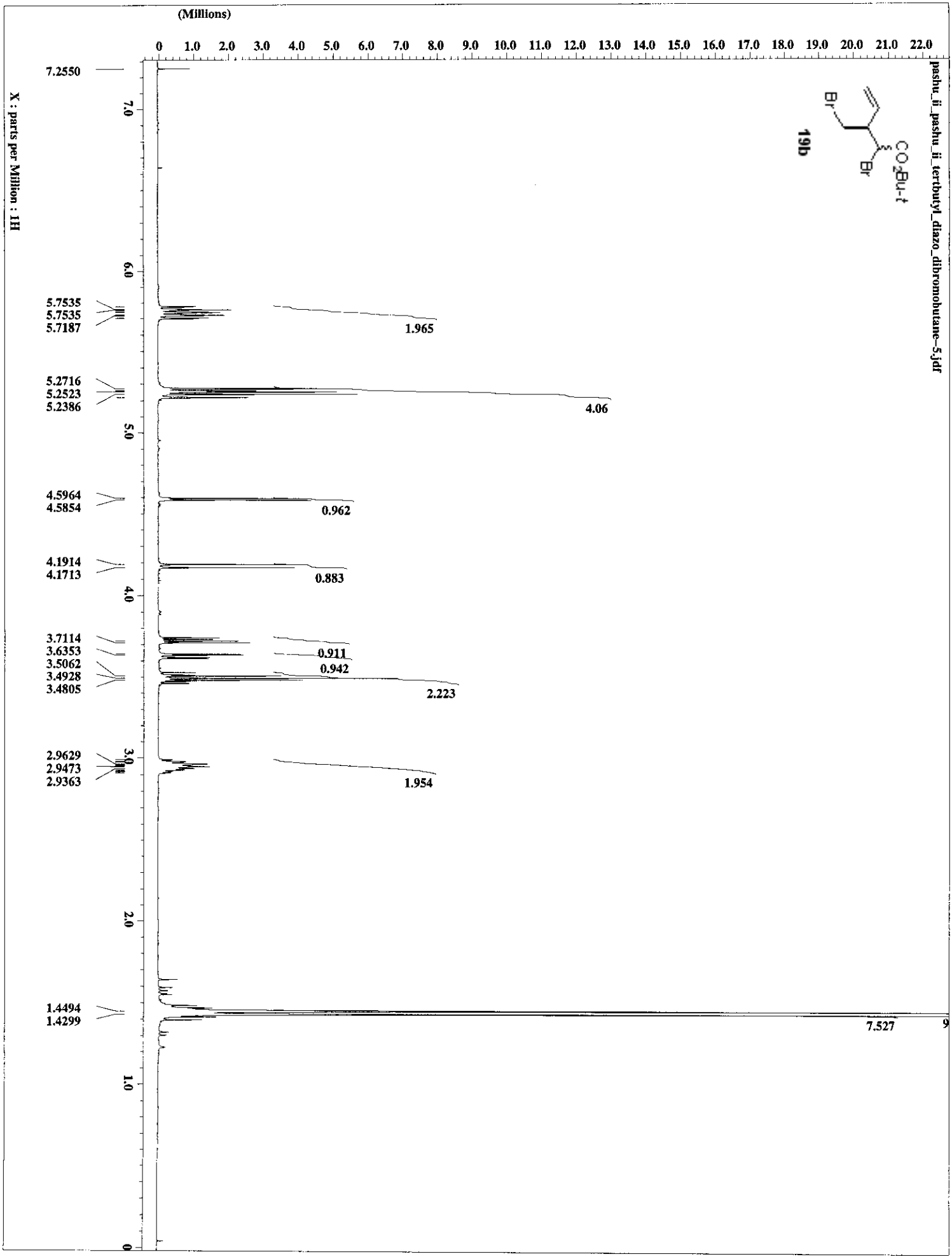
18b


pashu_ii_1,4dibromobuteneand diazoacetate-4.jdf
CO2Et
Br
Br
19a
abundance
0.98
2.11
0.48
0.45
1.88
0.52
0.51
1.06
1.02
3.08
7.258
5.745
5.739
5.716
5.710
5.277
5.264
5.261
4.701
4.690
4.684
4.202
4.197
4.191
4.172
4.168
3.519
3.511
3.505
3.499
3.494
3.487
3.015
3.013
2.989
1.278
1.271
1.254
X : parts per Million : 1H

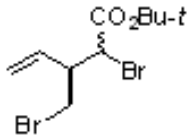

1,4_dibromobutene and ethyldiazoacetate-3.jdf
CO2Et
Br
Br
19a
abundance
0.3
0.2
0.1
0
170.0
160.0
150.0
140.0
130.0
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
168.454
168.134
134.084
133.759
120.971
120.455
77.595
77.174
76.749
62.556
62.183
50.012
48.454
47.646
36.082
34.357
14.155
14.036
X : parts per Million : 13C


(Millions)
0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
pashu_ji_154-5.jdf
X : parts per Million : 1H
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0
23b
H
H
Br
CO2Bu-t
5.6166
5.5964
5.5836
1.02
4.9670
4.9643
4.9624
4.9560
4.9542
4.7371
1.859
1.034
1.4801
9


pashu_ii_154-3.jdf
H
H
Br
H
CO2Bu-t
23b
(Millions)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
210.0
200.0
190.0
180.0
170.0
160.0
150.0
140.0
130.0
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
209.1871
166.9896
89.5880
83.0256
78.3442
77.3675
77.1118
76.8600
44.6548
27.7911
X : parts per Million : 13C


(Millions)
X : parts per Million : 1H
pashu_ii_pashu_ii_tertbutyl_diazo_dibromobutane-5.jdf
19b
Br
CO2Bu-t
Br
7.2550
5.7535
5.7535
5.7187
1.965
5.2716
5.2523
5.2386
4.06
4.5964
4.5854
0.962
4.1914
4.1713
0.883
3.7114
3.6353
0.911
3.5062
0.942
3.4928
3.4805
2.223
2.9629
2.9473
2.9363
1.954
1.4494
1.4299
7.527

II_t_bu_diazocetate_dibromobutene-3.jdf



19b

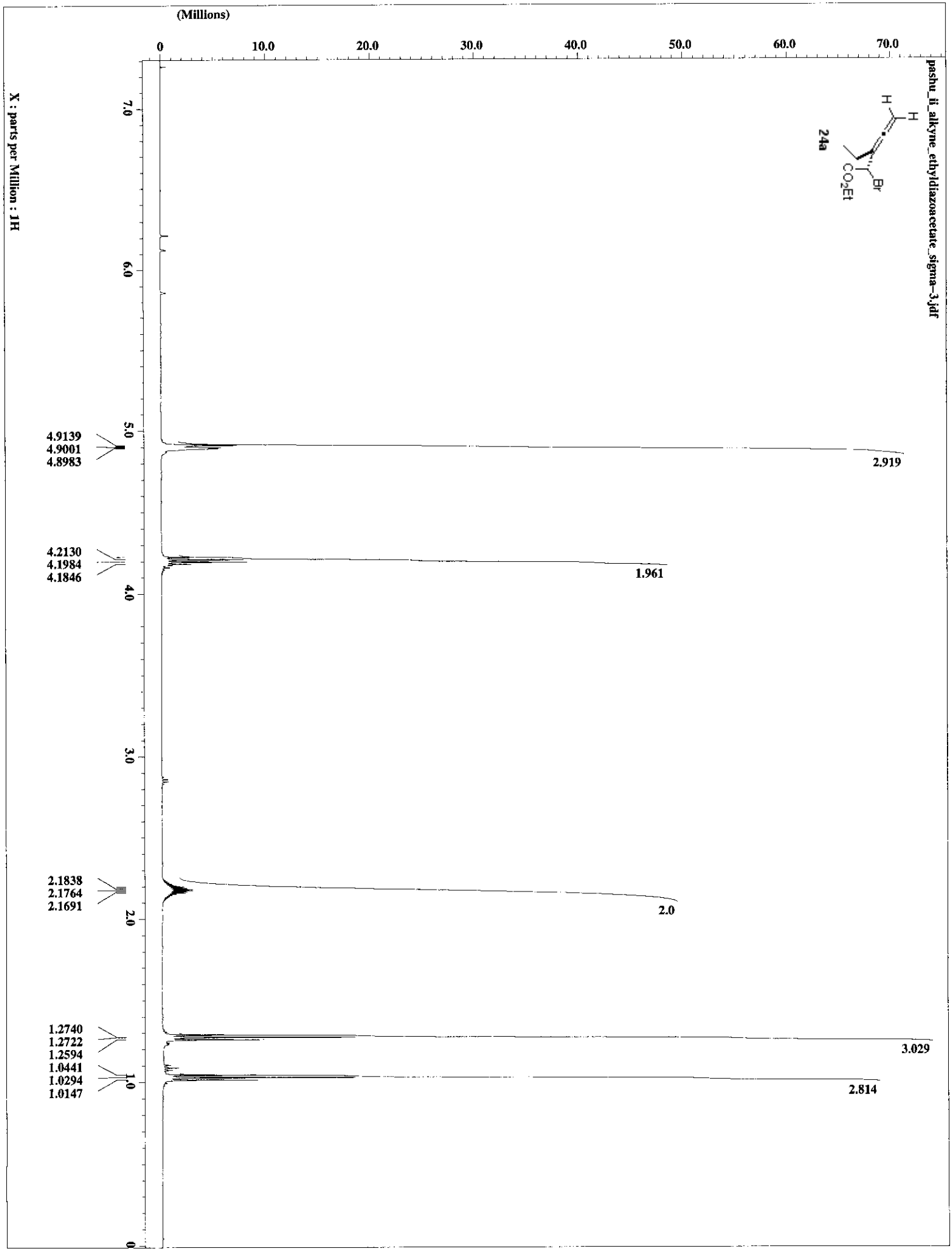
abundance

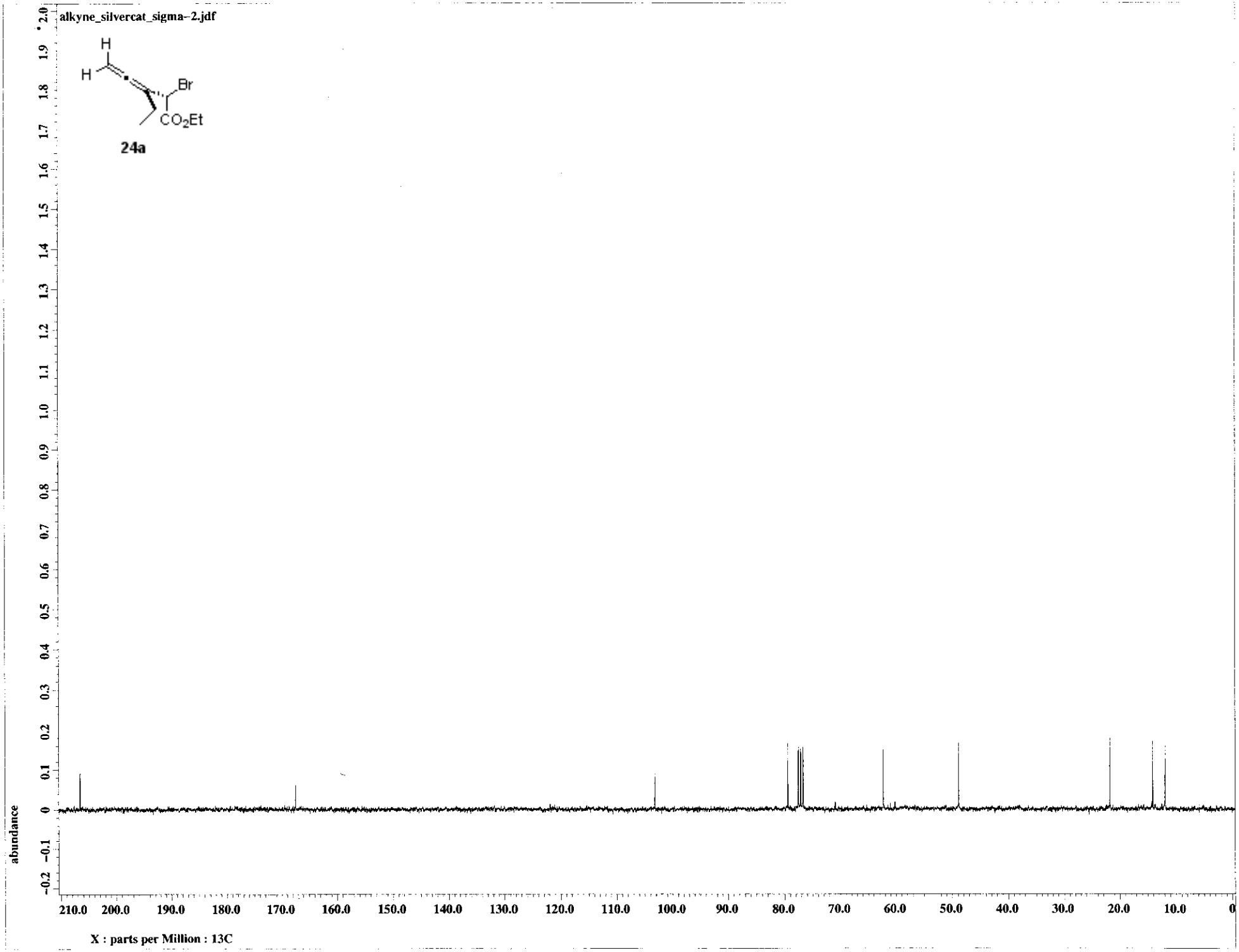
1.1 1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0 −0.1

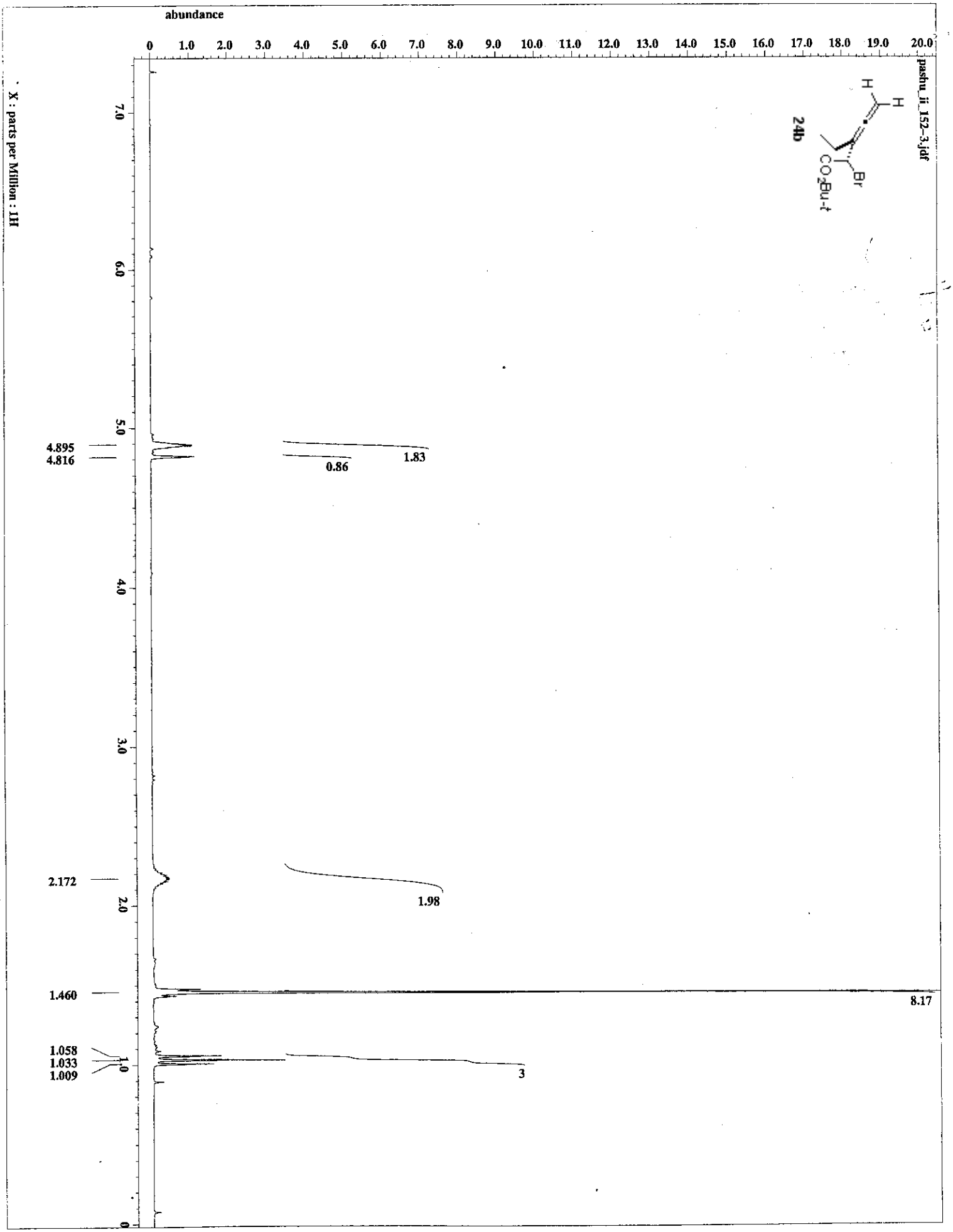
190.0 180.0 170.0 160.0 150.0 140.0 130.0 120.0 110.0 100.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 0

167.412
167.020
134.208
133.883
120.814
120.278
83.364
82.934
77.542
77.121
76.701
51.451
49.204
48.631
47.627
36.307
34.567
27.932
27.808

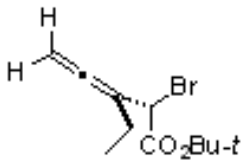
X : parts per Million : 13C


(Millions)
0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
X : parts per Million : 1H
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0
pashu_ii_alkyne_ethyldiazoacetate_sigma-3.jdf
24a
H
H
Br
CO2Et
4.9139
4.9001
4.8983
2.919
4.2130
4.1984
4.1846
1.961
2.1838
2.1764
2.1691
2.0
1.2740
1.2722
1.2594
1.0441
1.0294
1.0147
3.029
2.814


alkyne_silvercat_sigma-2.jdf
H
H
Br
CO2Et
24a
abundance
2.0
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-0.1
-0.2
210.0
200.0
190.0
180.0
170.0
160.0
150.0
140.0
130.0
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
X : parts per Million : 13C

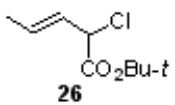

abundance
0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0 16.0 17.0 18.0 19.0 20.0
pashu_ii_152-3.jdf
24b
H
H
Br
CO2Bu-t
X : parts per Million : 1H
4.895
4.816
0.86
1.83
2.172
1.98
1.460
8.17
1.058
1.033
1.009
3
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0

pashu_ii_152-3.jdf

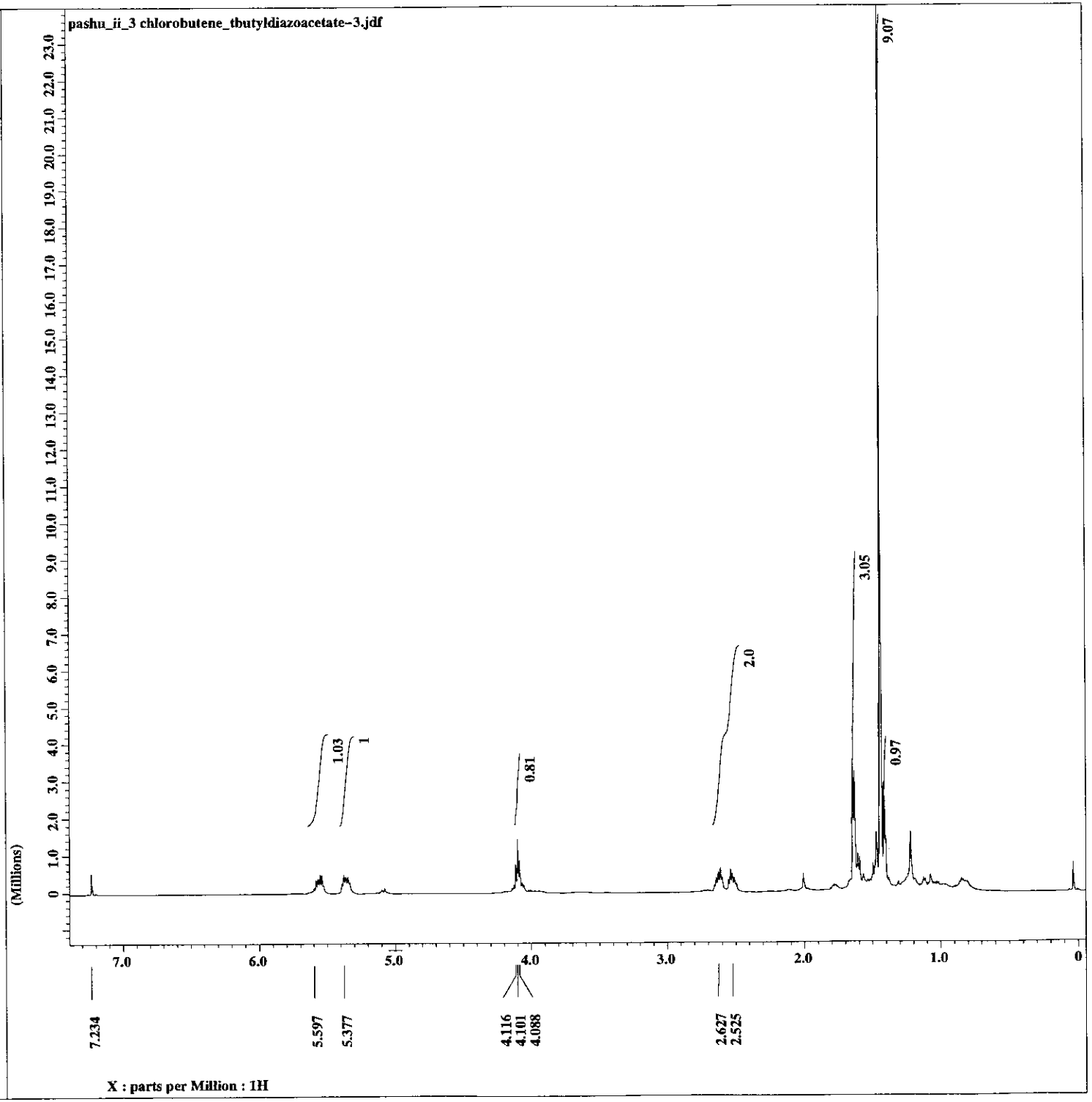


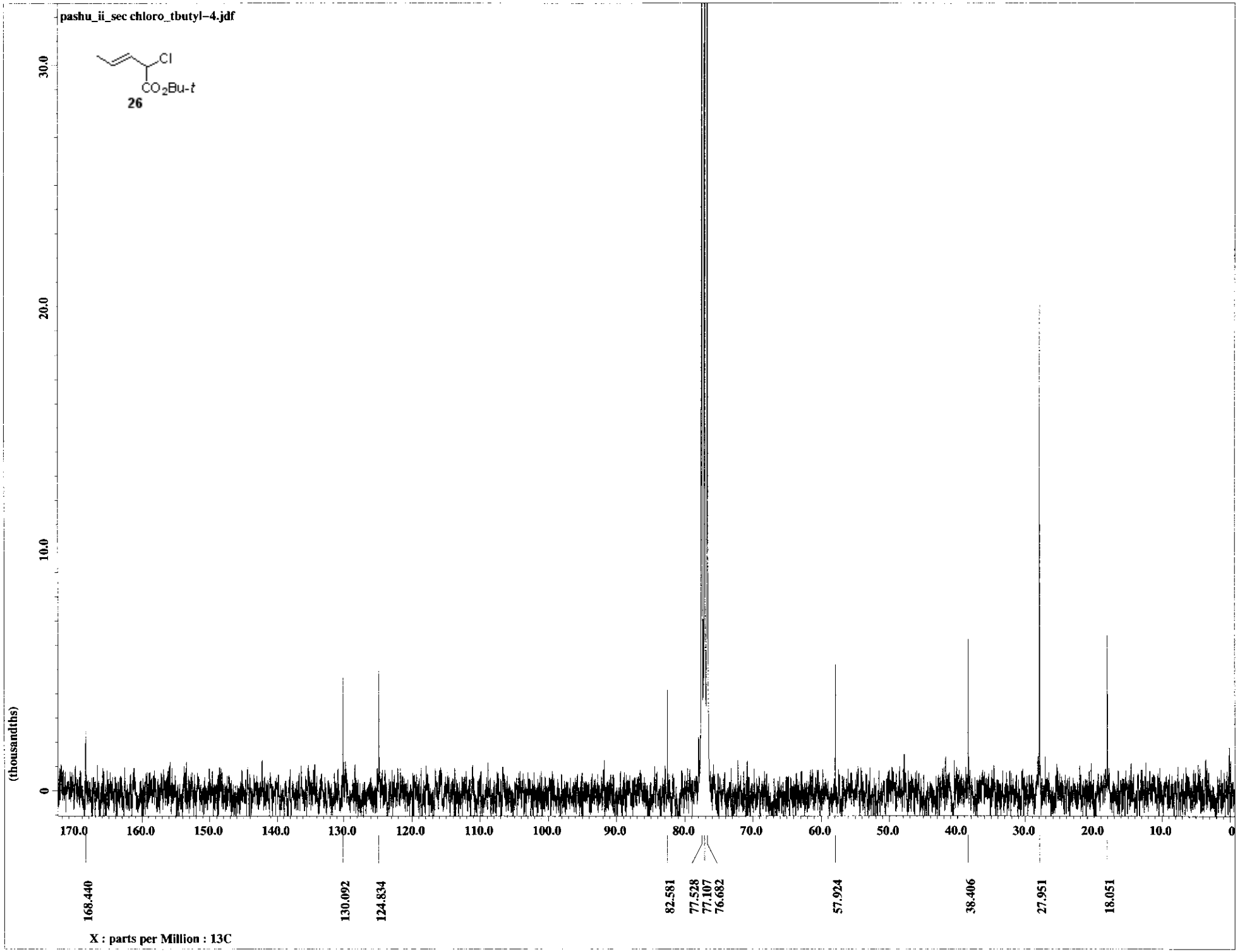
24b

Filename	= pashu_ii_3 chlorobute
Author	= delta
Experiment	= single_pulse.exp
Sample_id	= S#335649
Solvent	= CHLOROFORM-D
Creation_time	= 8-MAY-2006 09:31:52
Revision_time	= 8-MAY-2006 12:18:47
Current_time	= 8-MAY-2006 12:20:04
Content	= Single Pulse Experime
Data_format	= 1D COMPLEX
Dim_size	= 16384
Dim_title	= 1H
Dim_units	= [ppm]
Dimensions	= X
Site	= Eclipse+ 500
Spectrometer	= DELTA_NMR
Field_strength	= 11.7473579[T] (500[MH
X_acq_duration	= 2.1823488[s]
X_domain	= 1H
X_freq	= 500.15991521[MHz]
X_offset	= 5[ppm]
X_points	= 16384
X_prescans	= 0
X_resolution	= 0.45822189[Hz]
X_sweep	= 7.50750751[kHz]
Clipped	= FALSE
Mod_return	= 1
Scans	= 24
Total_scans	= 24
X_90_width	= 18.5[us]
X_acq_time	= 2.1823488[s]
X_angle	= 45[deg]
X_pulse	= 9.25[us]
Initial_wait	= 1[s]
Phase_preset	= 3[us]
Recvr_gain	= 15
Relaxation_delay	= 4[s]
Temp_get	= 25.8[dC]
Unblank_time	= 2[us]



26




pashu_ii_sec chloro_tbutyl-4.jdf
Cl
CO2Bu-t
26
30.0
20.0
10.0
0
(thousandths)
170.0
160.0
150.0
140.0
130.0
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
168.440
130.092
124.834
82.581
77.528
77.107
76.682
57.924
38.406
27.951
18.051
X : parts per Million : 13C