Supporting Information

Photosensitizer-Promoted Photoaddition Reactions of α-Silyl Group Containing *N*-Alkyl Glycinates to Dimethyl Acetylenedicarboxylate (DMAD)

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Table of Contents

Experimental

General. The ^{1}H (300 MHz) and ^{13}C NMR (75 MHz) spectra were recorded $CDCl_3$, and chemical shifts were reported in parts per million (d, ppm) relative to $CHCl_3$ (7.24 ppm for ^{1}H and 77 ppm for ^{13}C) as an internal standard. HRMS data were obtained by using an either EI or FAB. All starting materials used in the synthetic sequences came from commercial sources. All new compounds described were isolated in > 95% purity (by NMR analysis) unless noted otherwise.

Preparation of *N*-α-trimethylsilyl-*N*-alkyl glycinates 8a-8e. Individual MeCN solutions (100 mL) containing primary amines **6a**-**6e** and **9** (10 mmol), K_2CO_3 (30 mmol), and (iodomethyl)trimethylsilane ($TMSCH_2I$, 5 mmol) were stirred in 12 h at 80 ºC. Then, the reaction mixtures were evaporated in vacuo to give residues that were triturated with CH_2Cl_2. The resulting triturates were dried and concentrated in vacuo to afford residues, which were subjected to silica gel column chromatography (EtOAc: Hex = 1: 5 - 1:10) to yield corresponding *N*-α-trimethylsilyl-*N*-alkyl amines **7a** (57%), **7b** (48%), **7c** (60%), **7d** (89%), **7e** (62%) and **10** (52%). Similar to above synthetic sequences, individual MeCN solutions containing **7a**-**7e** and **10** (5 mmol), K_2CO_3 (10 mmol) and $BrCH_2CN$ (5 mmol) were stirred for 12 h at room temperature. By employing nearly equal work-up processes mentioned above, all of glycinates **8a**[1] (78 %), **8b** (69 %), **8c** (72 %), **8d**[2] (77 %), **8e** (85 %) and **8f** (55 %) were successfully prepared.

8a: ^{1}H NMR δ 0.02 (s, 9H), 0.84 (t, 3H, *J* = 6.6 Hz), 1.21-1.25 (m, 6H), 1.34-1.41 (m, 2H), 2.11 (s, 2H), 2.52 (t, 2H, *J* = 7.2 Hz), 3.26 (s, 3H), 4.11 (q, 2H, *J* = 6.9 Hz); ^{13}C NMR δ -1.8, 13.8, 14.0, 22.4, 26.6, 27.3, 31.6, 45.5, 57.3, 57.6, 59.5, 170.9.

8b: ^{1}H-NMR 0.01 (s, 9H), 1.22 (t, 3H, *J* = 7.2 Hz), 2.19 (s, 2H), 2.79 (t, 2H, *J* = 6 Hz), 3.28 (s, 3H), 3.385 (s, 2H), 3.42 (t, 2H, *J* = 6 Hz), 4.10 (q, 2H, *J* = 7.2 Hz); ^{13}C-NMR -1.8, 14.0, 46.0, 56.3, 57.9, 58.3, 59.6, 71.0, 171.1; HRMS (EI) m/z 247.1605 (M+, $C_{11}H_{25}NO_3Si$ requires 247.1604).

8c: ^{1}H NMR δ 0.02 (s, 15H), 0.81 (s, 9H), 1.189 (t, 3H, *J* = 7.2 Hz), 2.18 (s, 2H), 2.70 (t, 2H, *J* = 6.3 Hz), 3.34 (s, 2H), 3.63 (t, 2H, *J* = 6.3 Hz)4.07 (q, 2H, *J* = 7.2 Hz); ^{13}C NMR δ -5.5, -1.6, 14.2, 18.2, 25.8, 46.6, 58.5, 59.2, 59.9, 61.9, 171.4; HRMS (EI) m/z 347.2310 (M+, $C_{16}H_{37}NO_3Si_2$ requires 347.2312).

8d: ^{1}H NMR δ 0.01 (s, 9H), 1.20 (t, 3H, *J* = 7.2 Hz), 2.16 (s, 2H), 3.20 (s, 2H), 3.71 (s, 2H), 4.09 (q, 2H, *J* = 7.2 Hz), 7.17-7.31 (m, 5H); ^{13}C NMR δ -1.6, 14.2, 45.5, 56.9, 59.8, 61.4, 126.9, 128.1, 128.7, 139.4, 171.2.

8e: ^{1}H NMR δ 0.06 (s, 9H), 1.27 (t, 3H, *J* = 7.2 Hz), 2.24 (s, 2H), 2.73-2.78 (m, 2H), 2.83-2.88 (m, 2H), 3.38 (s, 2H), 4.16 (q, 2H, *J* = 7.2 Hz), 7.15-7.29 (m, 5H); ^{13}C-NMR -1.6, 14.2, 34.0, 45.6, 57.8, 59.3, 59.9, 125.7, 128.1, 128.6, 140.2, 171.1; HRMS (EI) m/z 293.1807 (M+, $C_{16}H_{27}NO_2Si$ requires 293.1811).

8f: ^{1}H NMR δ ^{1}H-NMR 0.03 (s, 9H), 1.90 (s, 2H), 2.59 (t, 2H, *J* = 5.1 Hz), 3.21 (s, 2H), 4.33 (t, 2H, *J* = 5.1 Hz); ^{13}C-NMR -1.6, 49.8, 52.6, 59.0, 68.6, 167.7; HRMS (EI) m/z 187.1026 (M+, $C_8H_{17}NO_2Si$ requires 187.1029).

General procedure of photoreactions of glycinates 8a-8f with dimethyl acetylenedicarboxylate (DMAD). The individual solvent (220 mL) containing glycinates (3.2 mM), DMAD (3.2 mM), and photosensitizers (0.27-0.32 mM) that were purged with oxygen before and during irradiations, were irradiated with a 450 W Hanovia medium pressure Hg lamp equipped by a flint glass filter (> 310 nm) for certain time periods to bring about 100% conversion of glycinates. Then, the photolysates were concentrated in vacuo to yield residues, which were subjected to silica gel column chromatography to determine photoproducts and their yields.

Photoreaction of 8a with DMAD. In MeCN solution of DCA: 5 min irradiation, column chromatography (EtOAc: hexane = 1: 5) to yield **12a** (10%), **13a** (9%) and **14a** (31%). In toluene solution of C_{60}: 10 min irradiation, column chromatography (EtOAc: hexane = 1: 5) to yield **12a** (11 %),

13a (6%) and **14a** (36%). In MeCN solution of RB: 5 min irradiation, column chromatography (EtOAc: hexane = 1: 5) to yield **12a** (31%), **13a** (8%) and **14a** (21%).

12a: ^{1}H NMR δ 0.38 (s, 9H), 0.86 (t, 3H, *J* = 6.6 Hz), 1.27-1.32 (m, 9H), 1.57-1.66 (m, 2H), 3.75 (s, 3H), 3.86 (s, 3H), 4.25 (q, 2H, *J* = 10.5 Hz), 4.39 (t, 2H, *J* = 7.8 Hz); ^{13}C-NMR 1.3, 13.9, 22.5, 26.2, 31.4, 33.1, 48.5, 51.5, 52.3, 60.9, 122.1, 123.4, 126.4, 144.1, 159.7, 164.3, 166.9; HRMS (EI) m/z 411.2079 (M+, $C_{20}H_{33}NO_6Si$ requires 411.2077).

13a: ^{1}H NMR δ 0.83 (t, 3H, *J* = 6.3 Hz), 1.23-1.33 (m, 9H), 1.68-1.75 (m, 2H), 3.78 (s, 3H), 3.90 (s, 3H), 4.21-4.28 (m, 4H), 7.33 (s, 1H); ^{13}C-NMR 14.0, 22.5, 26.2, 31.2, 31.3, 50.2, 51.6, 52.6, 60.9, 113.0, 120.2, 125.6, 130.9, 159.4, 163.0, 166.4; HRMS (EI) m/z 339.1680 (M+, $C_{17}H_{25}NO_6$ requires 339.1682).

14a: ^{1}H NMR δ 0.85 (t, 3H, *J* = 6 Hz), 1.23-1.27 (m, 9H), 1.55 (t, 2H, *J* = 6.6 Hz), 3.14 (t, 2H, *J* = 7.8 Hz), 3.59 (s, 3H), 3.80 (s, 2H), 3.88 (s, 3H), 4.18 (q, 2H, *J* = 6 Hz), 4.58 (s, 1H); ^{13}C-NMR 13.9, 14.1, 22.5, 26.4, 31.4, 50.9, 51.7, 52.5, 52.9, 61.6, 85.7, 154.1, 165.6, 167.8, 168.4; HRMS (EI) m/z 329.1839 (M+, $C_{16}H_{27}NO_6$ requires 329.1838).

Photoreaction of 8b with DMAD. In MeCN solution of DCA: 5 min irradiation, column chromatography (EtOAc: hexane = 1: 5) to yield **12b** (5%), **13b** (4%) and **14b** (40%). In toluene solution of C_{60}: 10 min irradiation, column chromatography (EtOAc: hexane = 1: 5) to yield **12b** (5 %) and **14b** (45%). In MeCN solution of RB: 5 min irradiation, column chromatography (EtOAc: hexane = 1: 5) to yield **12b** (24%), **13b** (1%) and **14b** (45%).

12b: ^{1}H NMR δ 0.38 (s, 9H), 1.29 (t, 3H, *J* = 7.2 Hz), 3.22 (s, 3H), 3.52 (t, 2H, *J* = 5.7 Hz), 3.76 (s, 3H), 3.86 (s, 3H), 4.24 (q, 2H, *J* = 7.2 Hz), 4.67 (t, 2H, *J* = 5.7 Hz); ^{13}C-NMR 1.5, 14.0, 47.6, 51.5, 52.4, 59.0, 60.9, 72.4, 121.7, 122.9, 126.9, 146.4, 159.8, 164.1, 167.1; HRMS (EI) m/z 385.1554 (M+, $C_{17}H_{27}NO_7Si$ requires 385.1557).

13b: ^{1}H NMR δ 1.30 (t, 3H, *J* = 7.2 Hz), 3.27 (s, 3H), 3.61 (t, 2H, *J* = 5.1 Hz), 3.78 (s, 3H), 3.90 (s, 3H), 4.24 (q, 2H, *J* = 7.2 Hz), 4.46 (t, 2H, *J* = 5.1 Hz), 7.41 (s, 1H); ^{13}C-NMR 13.9, 49.8, 51.6, 52.7, 58.9, 61.0, 71.4, 113.1, 119.8, 125.7, 132.5, 159.7, 163.0, 166.4; HRMS (FAB) m/z 3 14.1233 (M+1, $C_{14}H_{20}NO_7$ requires 314.1234).

14b: ^{1}H NMR δ 1.25 (t, 3H, *J* = 7.2 Hz), 3.27 (s, 3H), 3.36 (t, 2H, *J* = 5.1 Hz), 3.51 (t, 2H, *J* = 5.1 Hz), 3.60 (s, 3H), 3.88 (s, 3H), 3.96 (s, 2H), 4.18 (q, 2H, *J* = 7.2 Hz), 4.59 (s, 1H); ^{13}C-NMR 14.1, 50.9, 52.0, 52.8, 53.0, 58.9, 61.4, 77.2, 86.1, 154.1, 165.6, 167.7, 168.3; HRMS (EI) m/z 303.1317 (M+, $C_{13}H_{21}NO_7$ requires 303.1318).

Photoreaction of 8c with DMAD In MeCN solution of DCA: 5 min irradiation, column chromatography (EtOAc: hexane = 1: 5) to yield **12c** (7%), **13c** (5%) and **14c** (33%). In toluene solution of C_{60}: 10 min irradiation, column chromatography (EtOAc: hexane = 1: 5) to yield **12c** (8%), **13c** (5%) and **14c** (34%). In MeCN solution of RB: 5 min irradiation, column chromatography (EtOAc: hexane = 1: 5) to yield **12c** (27%) and **14c** (26%).

12c: ^{1}H NMR δ -0.06 (s, 6H), 0.39 (s, 9H), 0.80 (s, 9H), 1.29 (t, 3H, *J* = 6 Hz), 3.72-3.76 (m, 2H), 3.76 (s, 3H), 3.85 (s, 3H), 4.22 (q, 2H, *J* = 6 Hz), 4.61 (t, 2H, *J* = 6.3 Hz); ^{13}C NMR δ -5.6, 1.5, 13.9, 18.3, 25.8, 49.4, 51.6, 52.3, 60.9, 63.8, 122.1, 123.8, 126.5, 145.2, 159.8, 164.2, 166.9; HRMS (FAB) m/z 486.2345 (M+H, $C_{22}H_{40}NO_7Si$ requires 486.2343).

13c: ^{1}H NMR δ -0.09 (s, 6H), 0.81 (s, 9H), 1.29 (t, 3H, *J* = 6.9 Hz), 3.77 (s, 3H), 3.82 (t, 2H, *J* = 4.8 Hz), 3.89 (s, 3H), 4.23 (q, 2H, *J* = 6.9 Hz), 4.41 (t, 2H, *J* = 4.8 Hz), 7.40 (s, 1H); ^{13}C NMR δ -5.7, 13.9, 18.1, 25.7, 29.7, 51.6, 52.1, 52.6, 60.9, 62.2, 112.8, 119.7, 125.8, 132.8, 159.7, 163.0, 166.3; HRMS (FAB) m/z 414.1949 (M+H, $C_{19}H_{32}NO_7Si$ requires 414.1948).

14c: ^{1}H NMR δ 0.02 (s, 6H), 0.85 (s, 9H), 1.25 (t, 3H, *J* = 7.2 Hz), 3.32 (t, 2H, *J* = 5.7 Hz), 3.60 (s, 3H), 3.74 (t, 2H, *J* = 5.7 Hz), 3.88 (s, 3H), 3.98 (s, 2H), 4.18 (q, 2H, *J* = 7.2 Hz), 4.58 (s, 1H); ^{13}C

NMR δ -5.6, 14.1, 18.1, 25.8, 50.9, 53.0, 54.1, 61.5, 77.2, 85.9, 154.1, 165.6, 167.8, 168.4; HRMS (EI) m/z 403.2029 (M+H, $C_{18}H_{33}NO_7Si$ requires 403.2026).

Photoreaction of 8d with DMAD. In MeCN solution of DCA: 5 min irradiation, column chromatography (EtOAc: hexane = 1: 5) to yield **12d** (6%) and **14d** (50%). In toluene solution of C_{60}: 10 min irradiation, column chromatography (EtOAc: hexane = 1: 5) to yield **12d** (38%) and **14d** (21%). In MeCN solution of RB: 5 min irradiation, column chromatography (EtOAc: hexane = 1: 5) to yield **12d** (11%) and **14d** (49%).

12d : ^{1}H NMR δ 0.26 (s, 9H), 1.19 (t, 3H, *J* = 7.2 Hz), 3.80 (s, 3H), 3.88 (s, 3H), 4.12 (q, 2H, *J* = 7.2 Hz), 5.77 (s, 2H), 6.78 (d, 2H, *J* = 7.2 Hz), 7.18-7.31 (m, 3H); ^{13}C-NMR 1.2, 14.0, 51.5, 51.8, 52.6, 61.1, 122.7, 124.4, 125.2, 126.7, 127.3, 128.8, 138.4, 145.6, 159.6, 164.4, 166.9; HRMS (FAB) m/z 418.1680 (M+H, $C_{21}H_{28}NO_6Si$ requires 418.1686).

14d: ^{1}H-NMR δ 1.23 (t, 3H, *J* = 6.9 Hz), 3.59 (s, 3H), 3.70 (s, 2H), 3.89 (s, 3H), 4.16 (q, 1H, *J* = 6.9 Hz), 4.38 (s, 2H), 4.70 (s, 1H), 7.22-7.34 (m, 5H); ^{13}C-NMR δ 14.2, 50.2, 51.1, 53.2, 55.2, 61.7, 87.0, 128.1, 128.3, 129.0, 134.9, 154.5, 165.9, 167.9, 168.3; HRMS (FAB) m/z 336.1445 (M+H, $C_{17}H_{22}NO_6$ requires 336.1447).

Photoreaction of 8e with DMAD. In MeCN solution of DCA: 5 min irradiation, column chromatography (EtOAc: hexane = 1: 5) to yield **12e** (9%), **13e** (6%) and **14e** (35%). In toluene solution of C_{60}: 10 min irradiation, column chromatography (EtOAc: hexane = 1: 5) to yield **12e** (5%), **13e** (8%) and **14e** (40%). In MeCN solution of RB: 5 min irradiation, column chromatography (EtOAc: hexane = 1: 5) to yield **12e** (19%), **13e** (6%) and **14e** (25%).

12e: ^{1}H NMR δ 0.38 (s, 9H), 1.30 (t, 3H, *J* = 7.2 Hz), 2.94 (t, 2H, *J* = 8.1 Hz), 3.77 (s, 3H), 3.87 (s, 3H), 4.25 (q, 2H, *J* = 7.2 Hz), 4.67 (t, 2H, *J* = 8.1 Hz), 7.17-7.31 (m, 5H); ^{13}C-NMR 1.4, 14.0, 39.0, 49.4, 51.6, 52.4, 61.0, 122.1, 123.2, 126.7, 126.8, 128.7, 128.8, 137.4, 144.5, 159.6, 164.2, 166.9; HRMS (EI) m/z 431.1761 (M+, $C_{22}H_{29}NO_6Si$ requires 431.1764).

13e: ^{1}H NMR δ 1.32 (t, 3H, *J* = 6.9 Hz), 3.02 (t, 2H, *J* = 7.8 Hz), 3.76 (s, 3H), 3.91 (s, 3H), 4.28 (q, 2H, *J* = 6.9 Hz), 4.48 (t, 2H, *J* = 7.8 Hz), 7.11-7.14 (m, 3H), 7.21-7.30 (m, 3H); ^{13}C-NMR 14.0, 37.9, 51.6, 51.7, 52.6, 61.0, 113.1, 120.0, 125.8, 126.9, 128.7, 128.8, 131.1, 137.3, 159.5, 162.9, 166.3; HRMS (EI) m/z 359.1367 (M+, $C_{19}H_{21}NO_6$ requires 359.1369).

14e: ^{1}H NMR δ 1.25 (t, 3H, *J* = 6.9 Hz), 2.88 (t, 2H, *J* = 7.2 Hz), 3.41 (t, 2H, *J* = 7.2 Hz), 3.63 (s, 3H), 3.67 (s, 2H), 3.90 (s, 3H), 4.18 (q, 2H, *J* = 6.9 Hz), 4.68 (s, 1H), 7.14 (d, 2H, *J* = 6.6 Hz), 7.21-7.31 (m, 3H); ^{13}C-NMR 14.1, 50.9, 52.5, 53.0, 54.2, 61.2, 86.2, 126.7, 128.6, 128.7, 137.9, 153.7, 165.6, 167.7, 168.3; HRMS (EI) m/z 349.1528 (M+, $C_{18}H_{23}NO_6$ requires 349.1525).

Photoreaction of 8f with DMAD. In MeCN solution of DCA: 5 min irradiation, column chromatography (EtOAc: hexane = 1: 5) to yield **12f** (51%) and **13f** (2%). In toluene solution of C_{60}: 10 min irradiation, column chromatography (EtOAc: hexane = 1: 5) to yield **12f** (44 %) and **13f** (1%). In MeCN solution of RB: 5 min irradiation, column chromatography (EtOAc: hexane = 1: 5) to yield **12f** (48%) and **13f** (1%).

12f: ^{1}H NMR δ 0.40 (s, 9H), 3.78 (s, 3H), 3.93 (s, 3H), 4.27 (t, 2H, *J* = 5.4 Hz), 4.58 (t, 2H, *J* = 5.4 Hz); ^{13}C-NMR 0.8, 44.8, 51.9, 53.0, 65.6, 120.8, 123.6, 126.7, 142.5, 156.8, 163.7, 165.6; HRMS (EI) m/z 325.0984 (M+, $C_{14}H_{19}NO_6Si$ requires 325.0982).

13f: ^{1}H NMR δ 3.79 (s, 3H), 3.94 (s, 3H), 4.23 (t, 2H, *J* = 5.4 Hz), 4.61 (t, 2H, *J* = 5.4 Hz), 7.38 (s, 1H); ^{13}C NMR δ 43.6, 51.9, 53.1, 65.8, 115.8, 117.9, 125.2, 127.1, 156.4, 162.4, 164.7; HRMS (EI) m/z 253.0583 (M+, $C_{11}H_{11}NO_6$ requires 253.0586).

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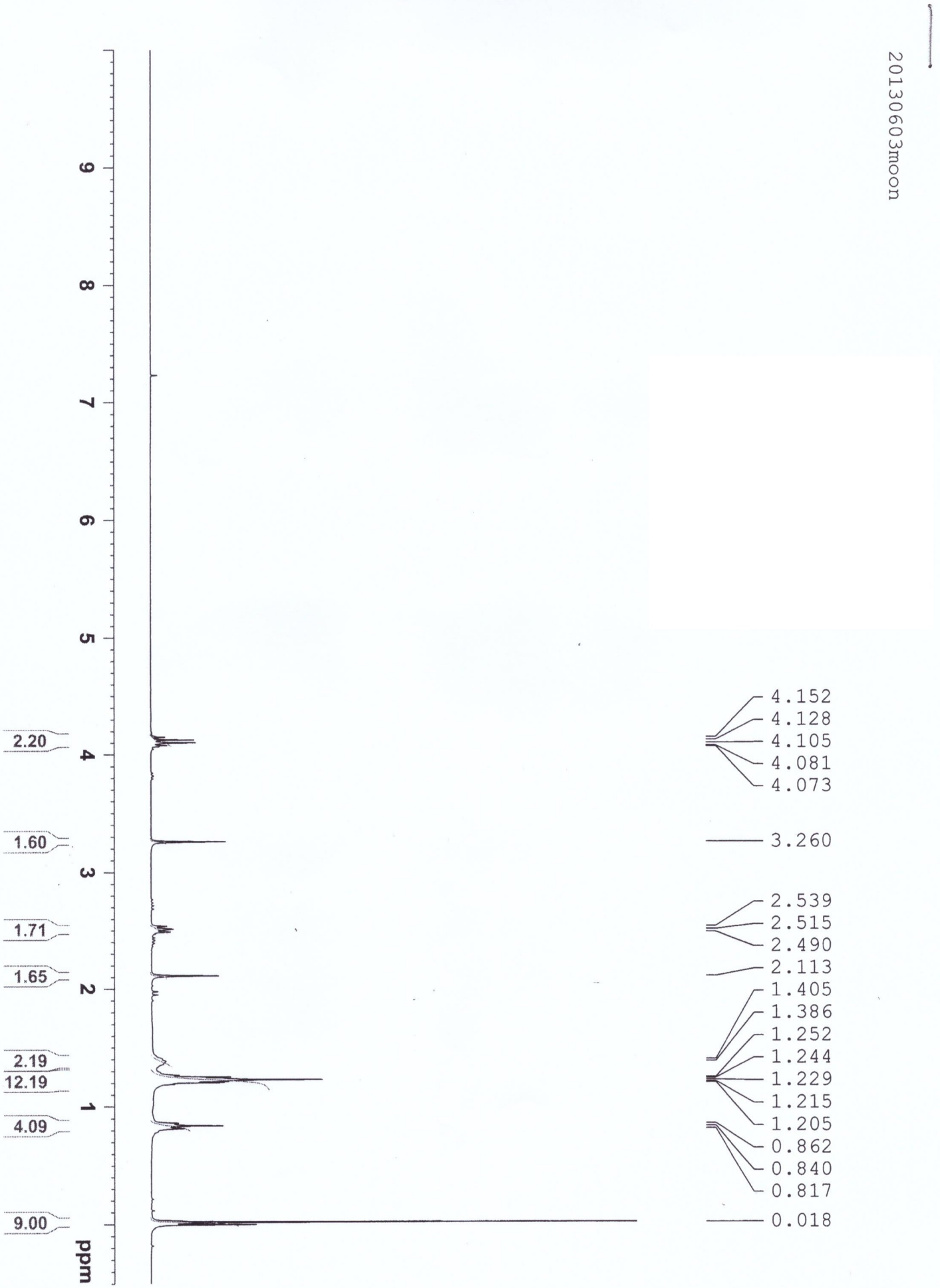
2. Lim, S. H.; Atar, A. B.; Bae, G.; Wee, K. -R.; Cho, D. W. *RSC Adv*. **2019**, *9*, 5639-5648.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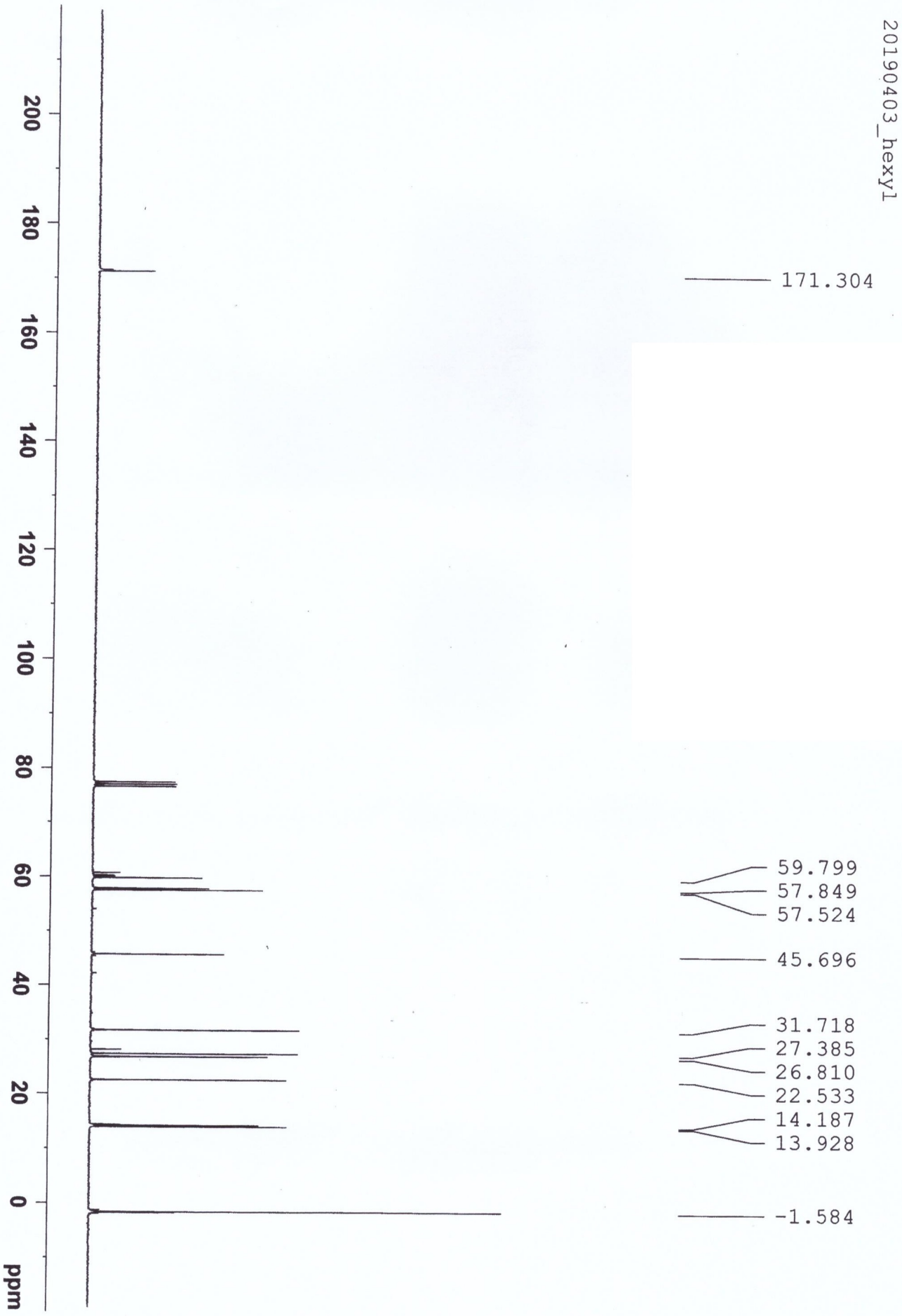
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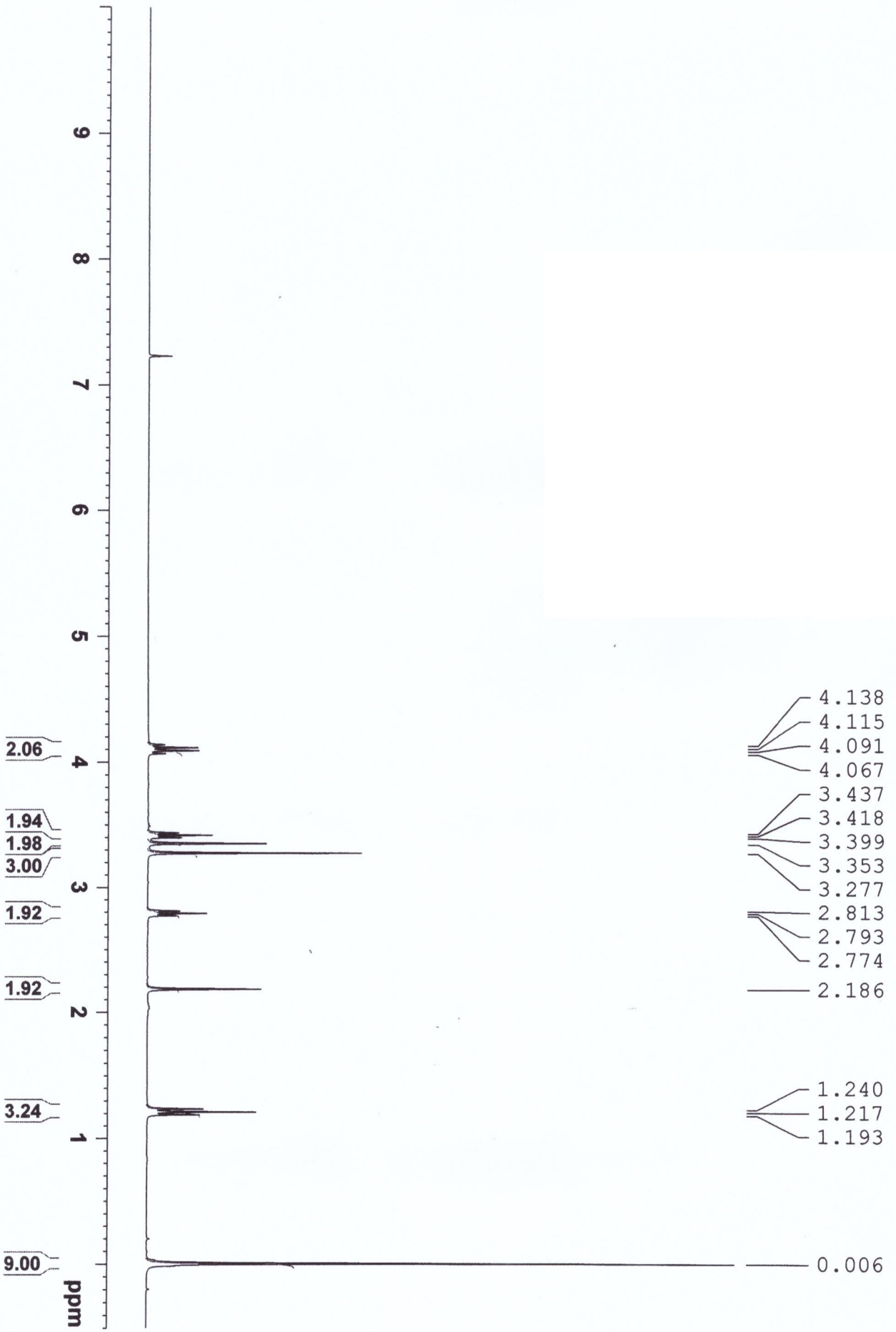
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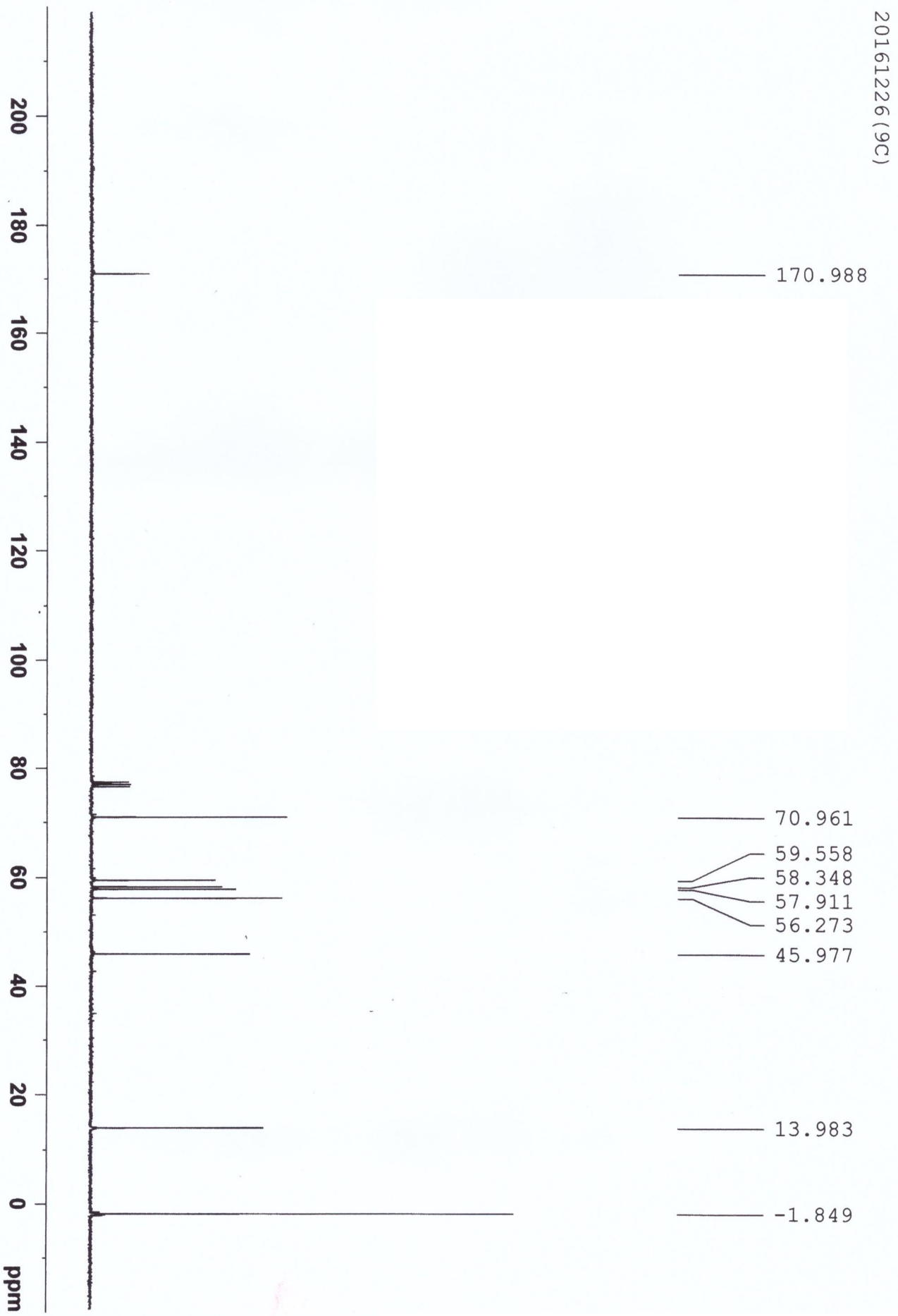
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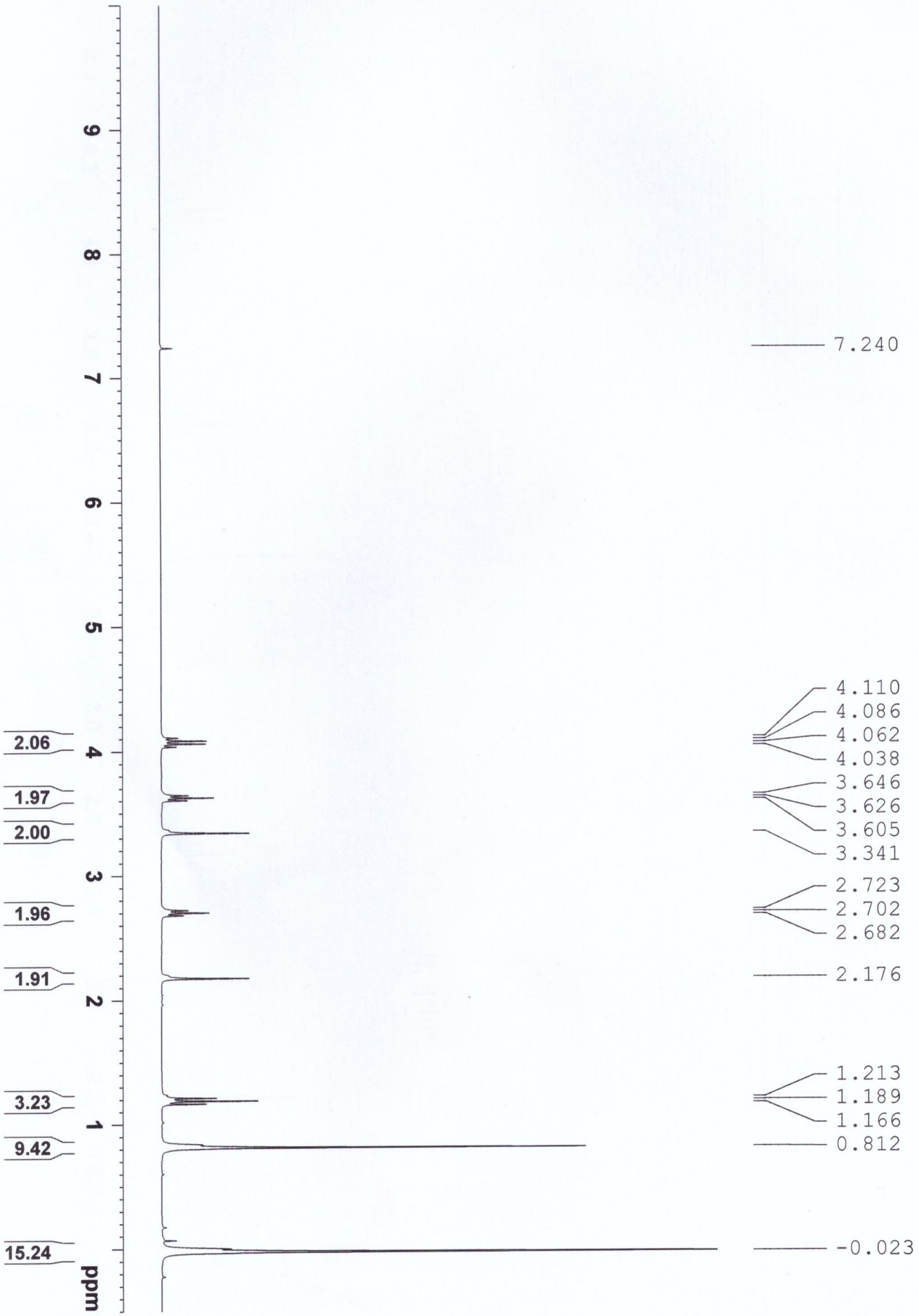
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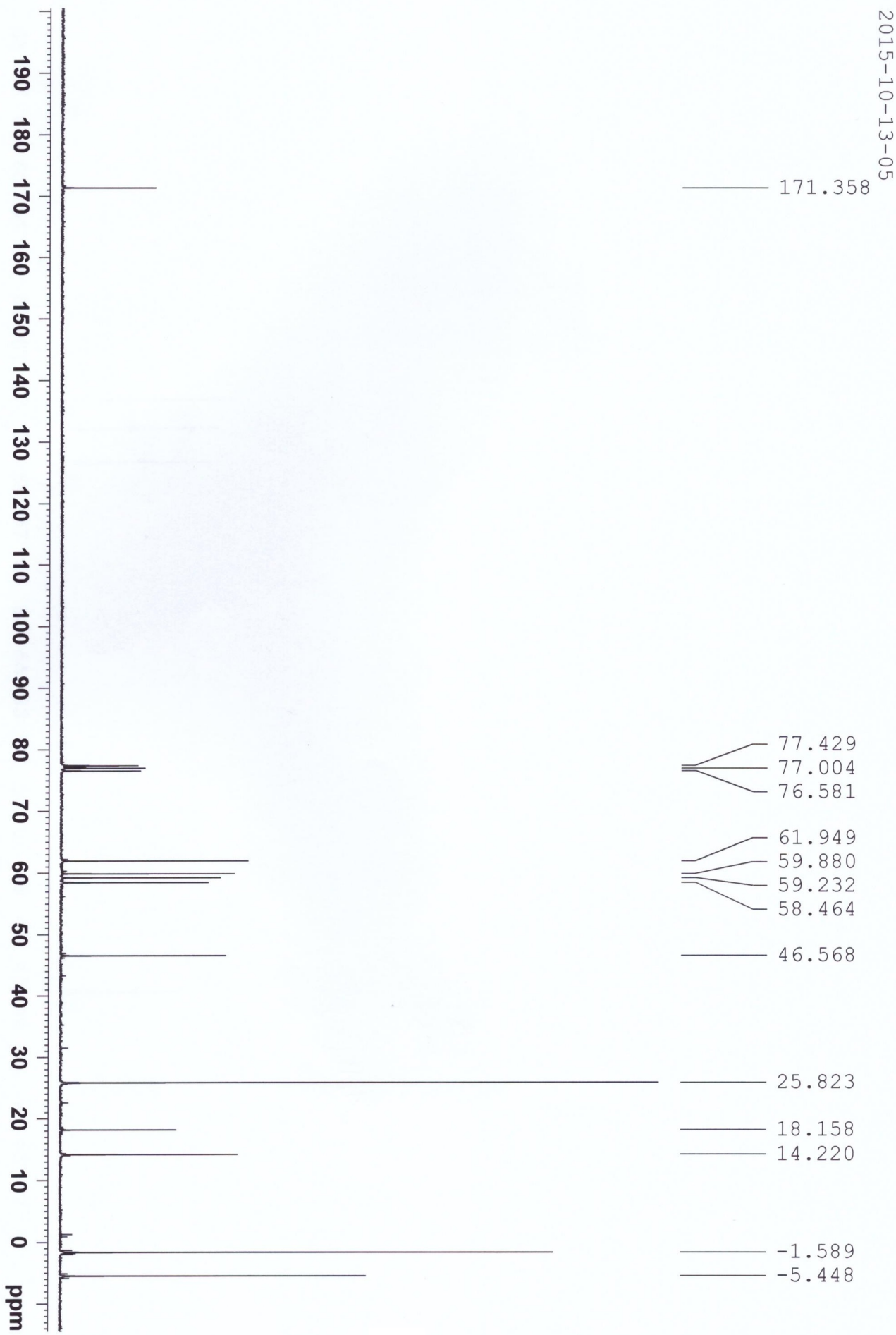
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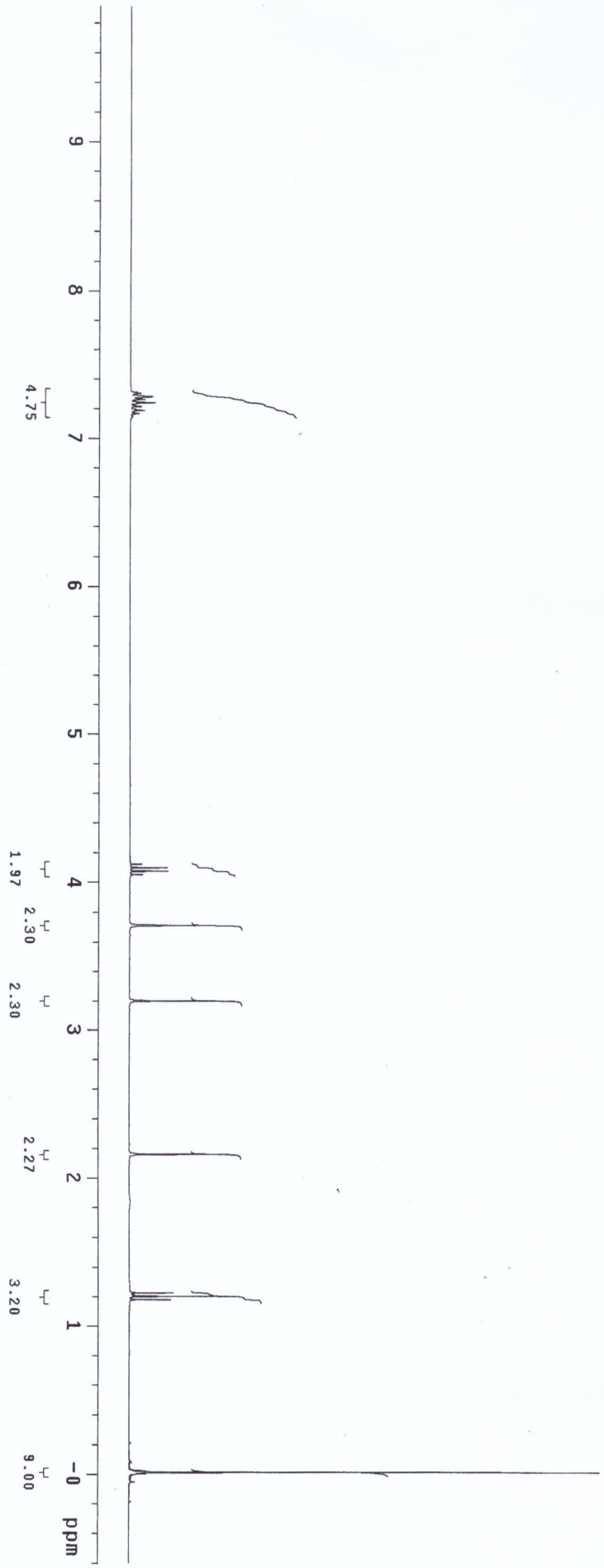
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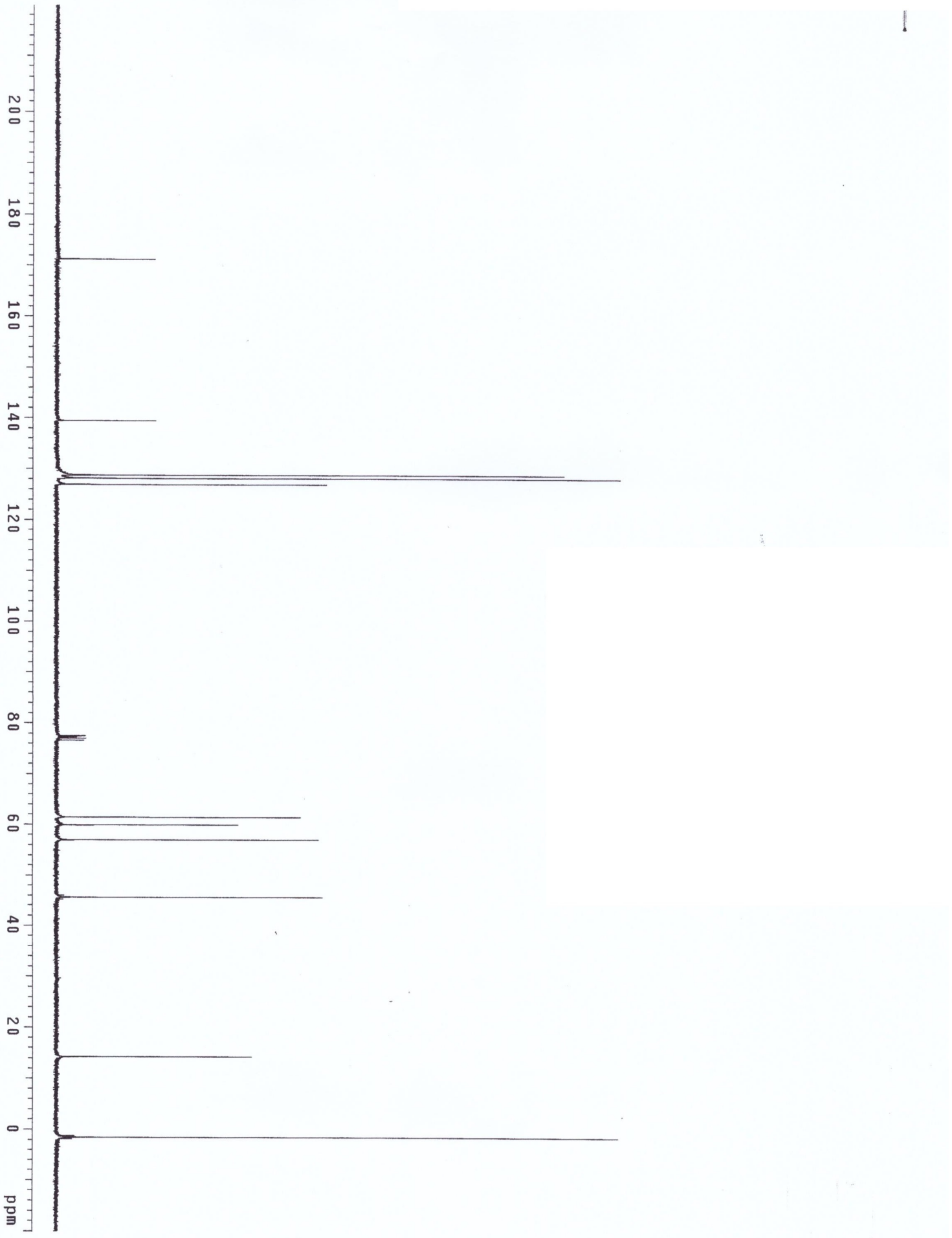
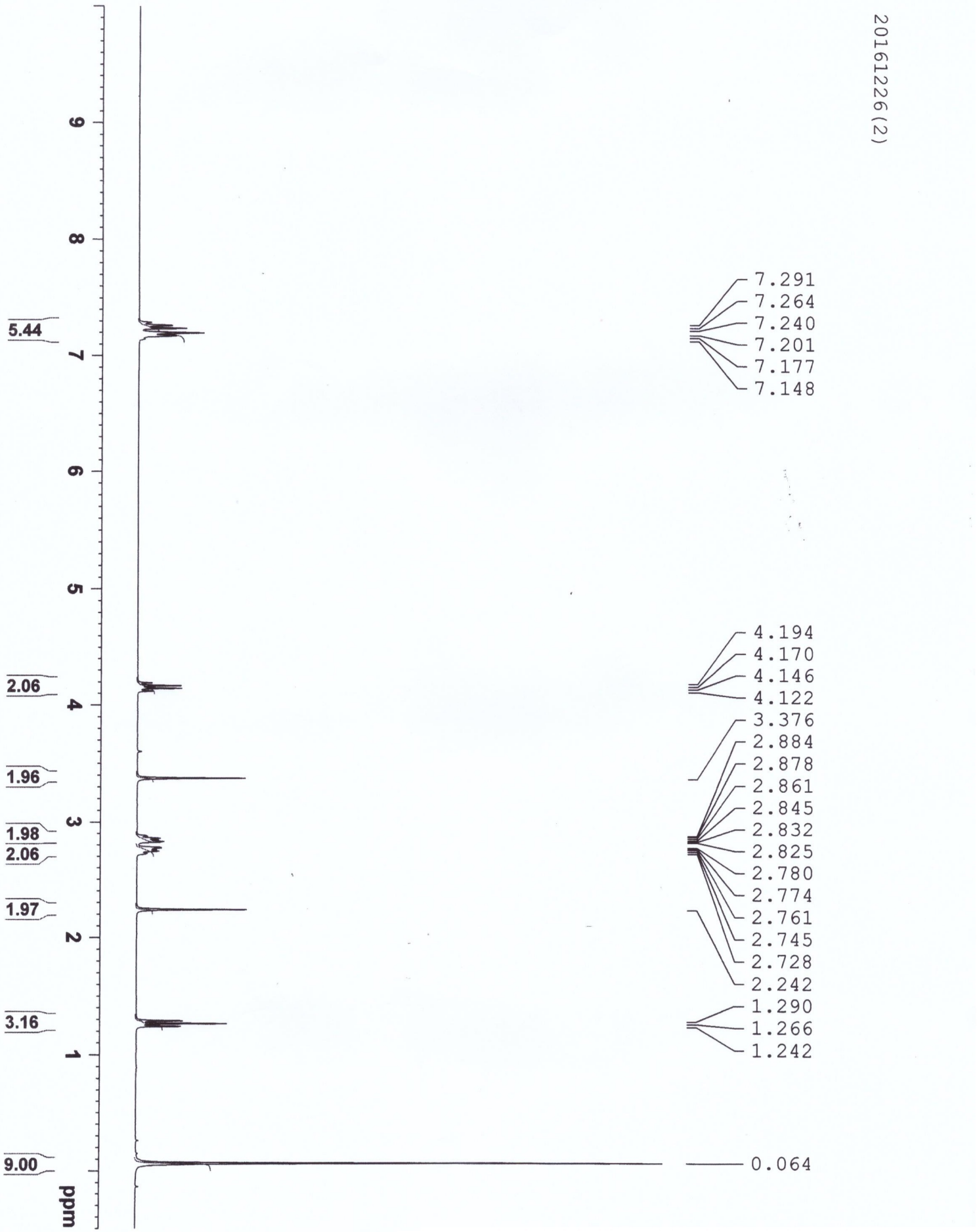
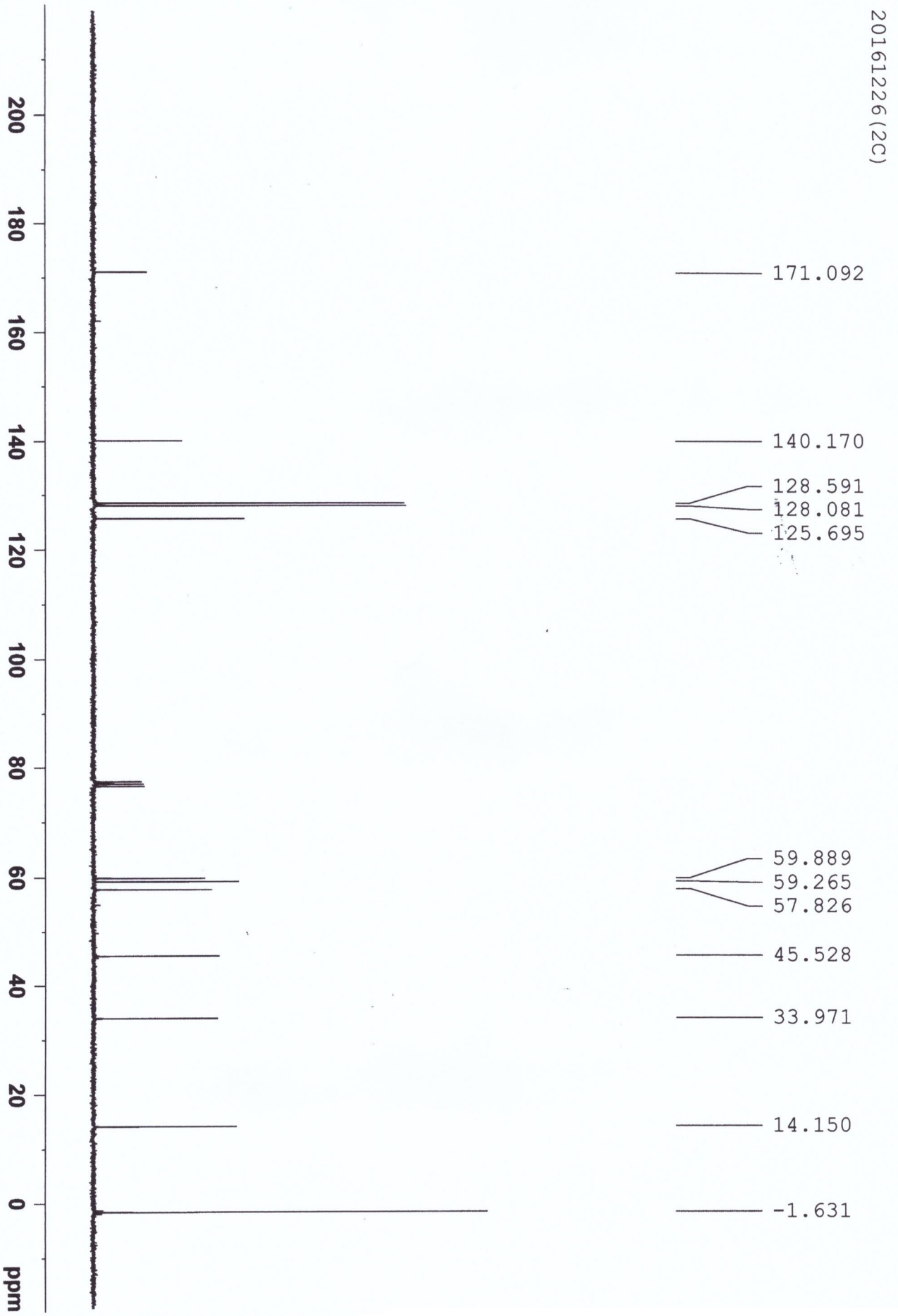



20161226(2)
7.291
7.264
7.240
7.201
7.177
7.148
4.194
4.170
4.146
4.122
3.376
2.884
2.878
2.861
2.845
2.832
2.825
2.780
2.774
2.761
2.745
2.728
2.242
1.290
1.266
1.242
0.064
5.44
2.06
1.96
1.98
2.06
1.97
3.16
9.00
ppm


20161226(2C)
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180
160
140
120
100
80
60
40
20
0
ppm
171.092
140.170
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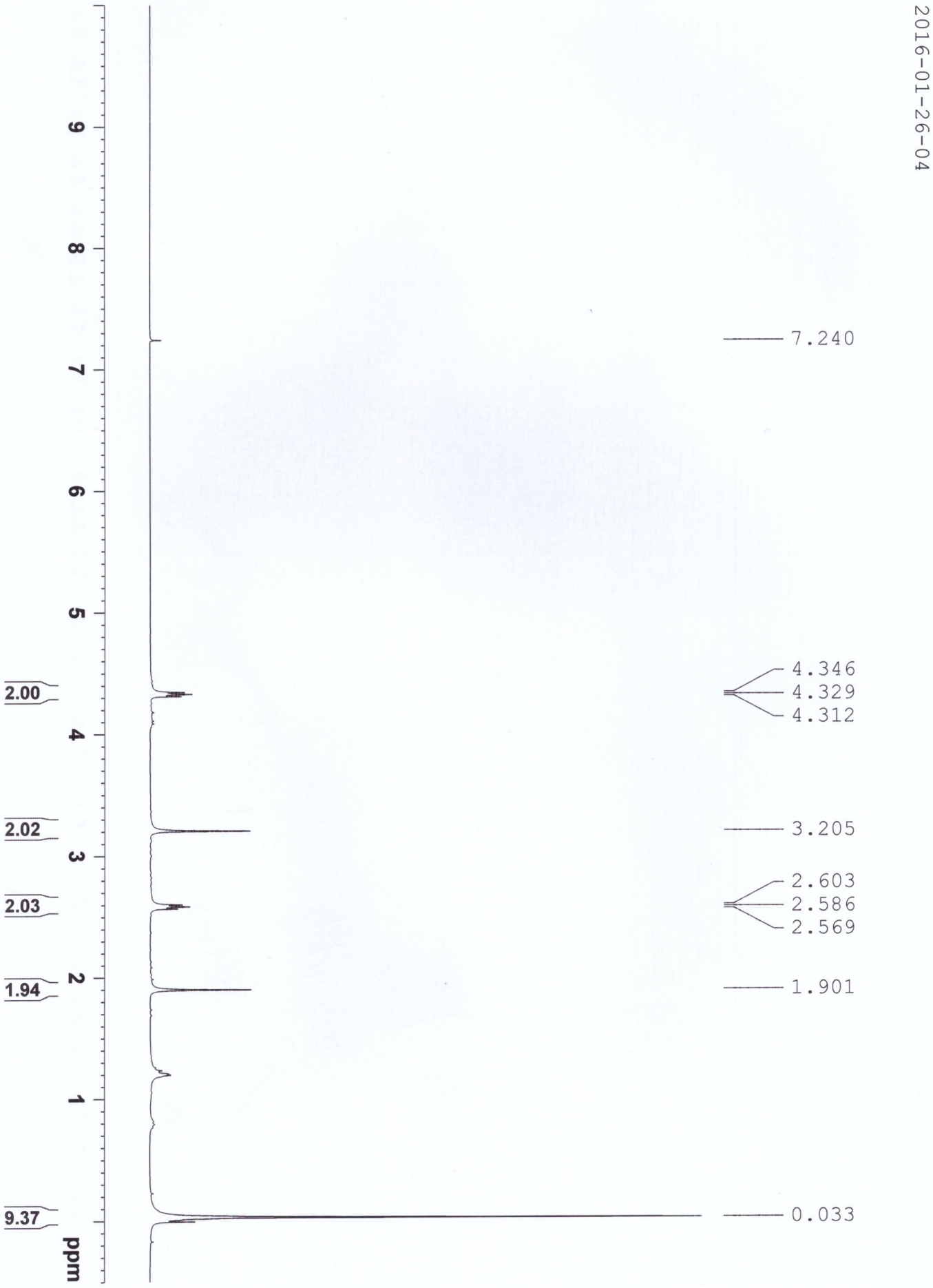
128.081
125.695
59.889
59.265
57.826
45.528
33.971
14.150
-1.631


2016-01-26-04
7.240
4.346
4.329
4.312
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2.02
2.03
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9.37
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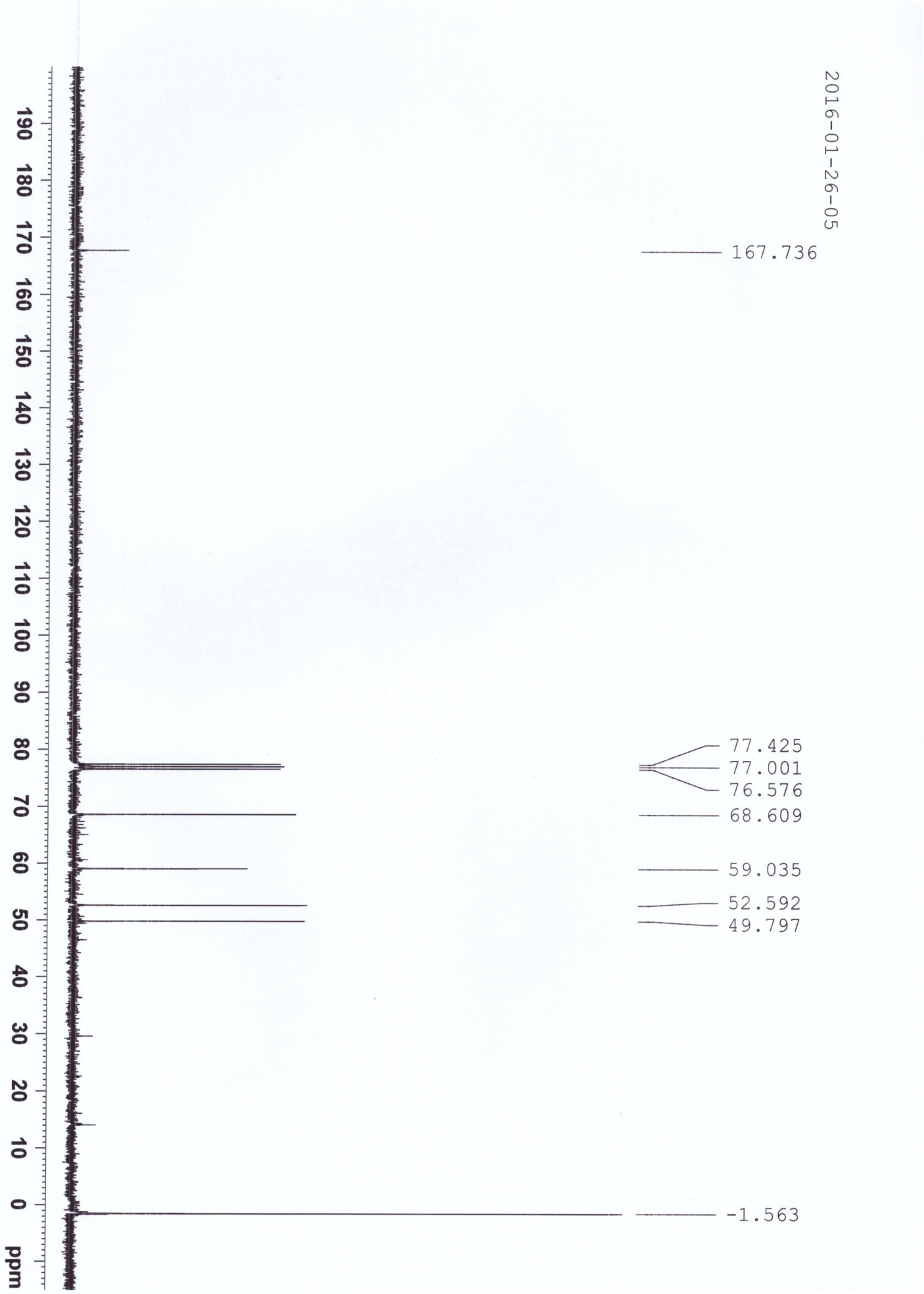
2016-01-26-05
167.736
77.425
77.001
76.576
68.609
59.035
52.592
49.797
-1.563
ppm
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150
140
130
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110
100
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80
70
60
50
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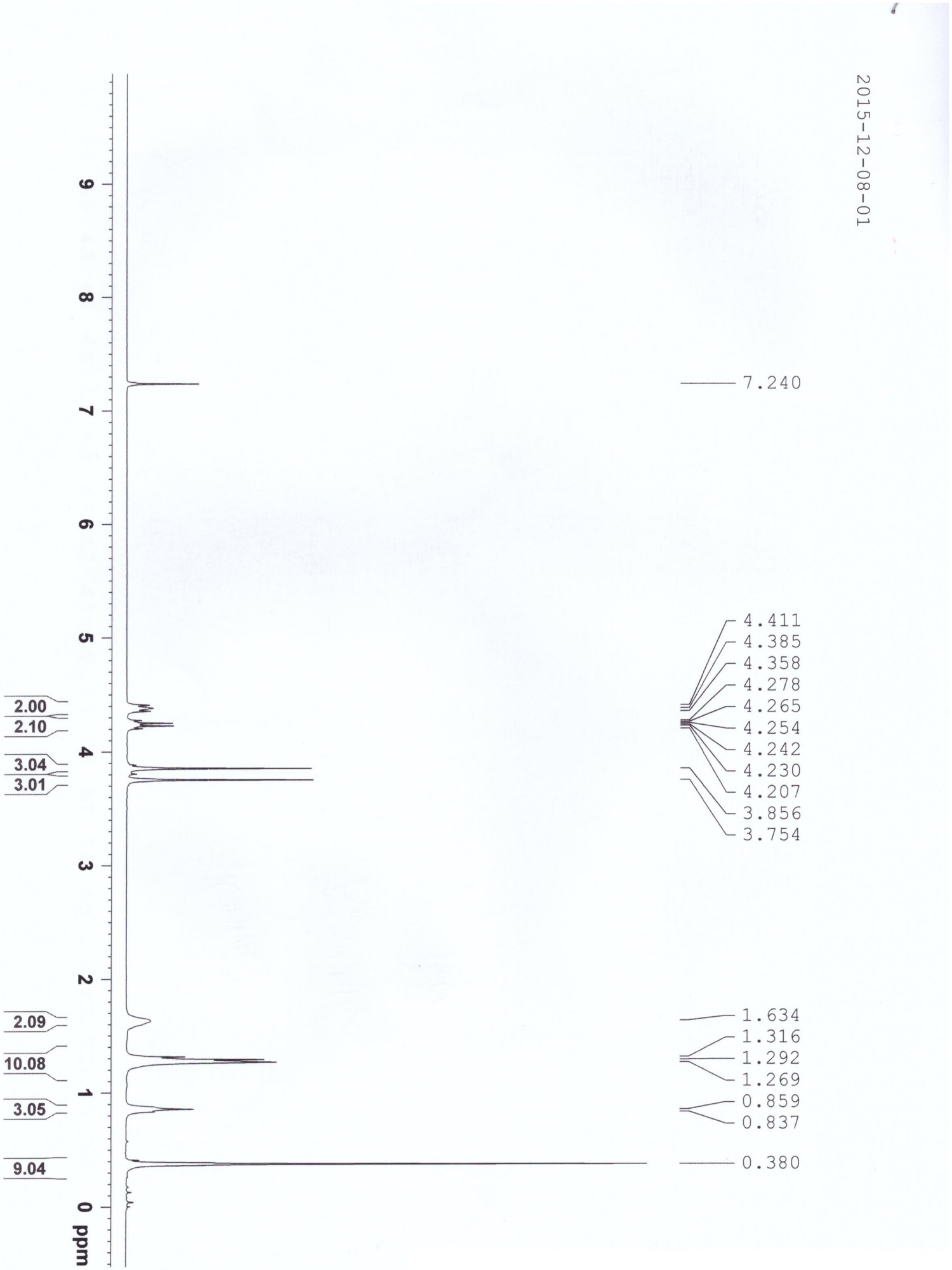
30
20
10
0


2015-12-08-01
7.240
4.411
4.385
4.358
4.278
4.265
4.254
4.242
4.230
4.207
3.856
3.754
1.634
1.316
1.292
1.269
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0.380
2.00
2.10
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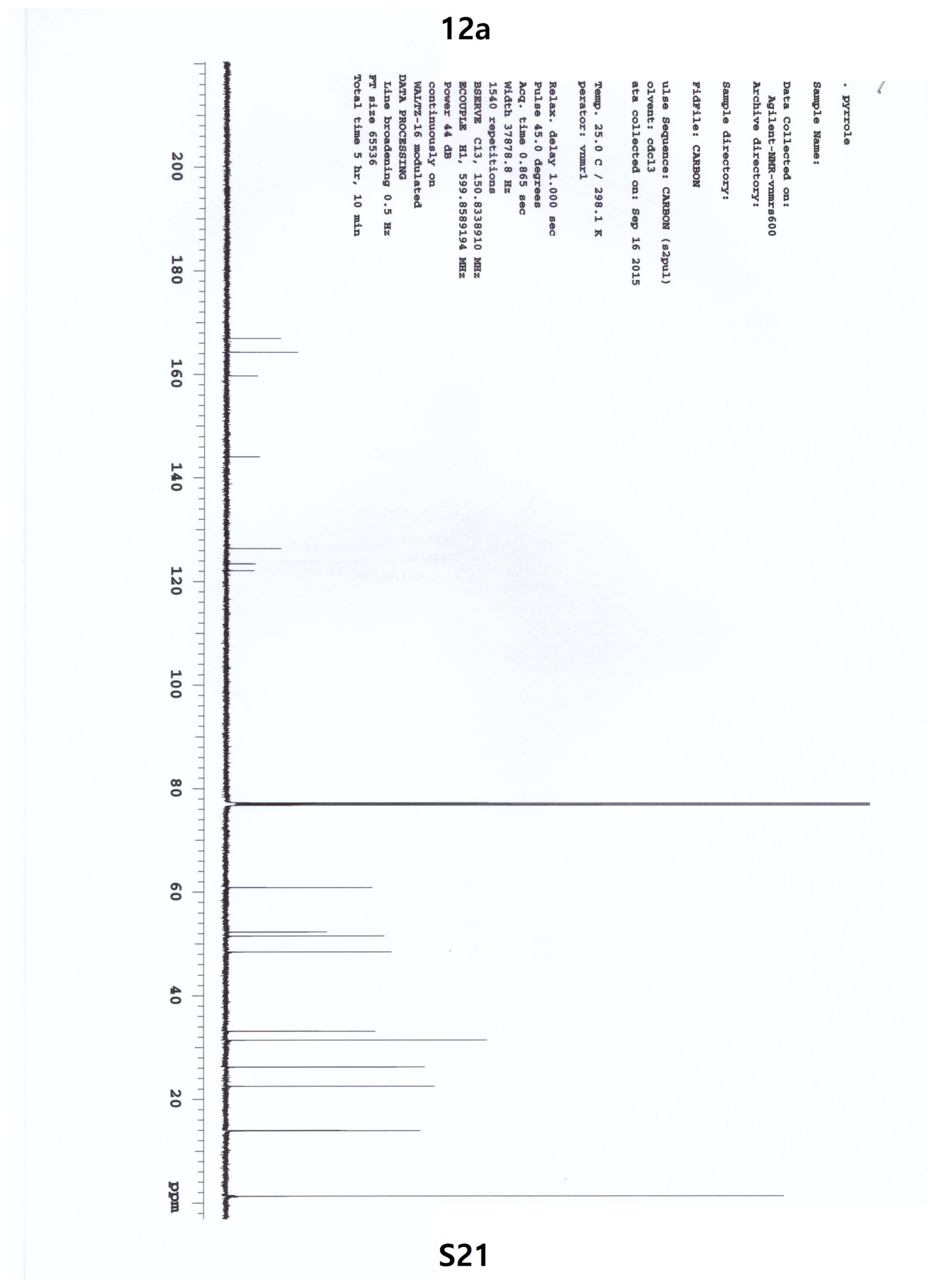
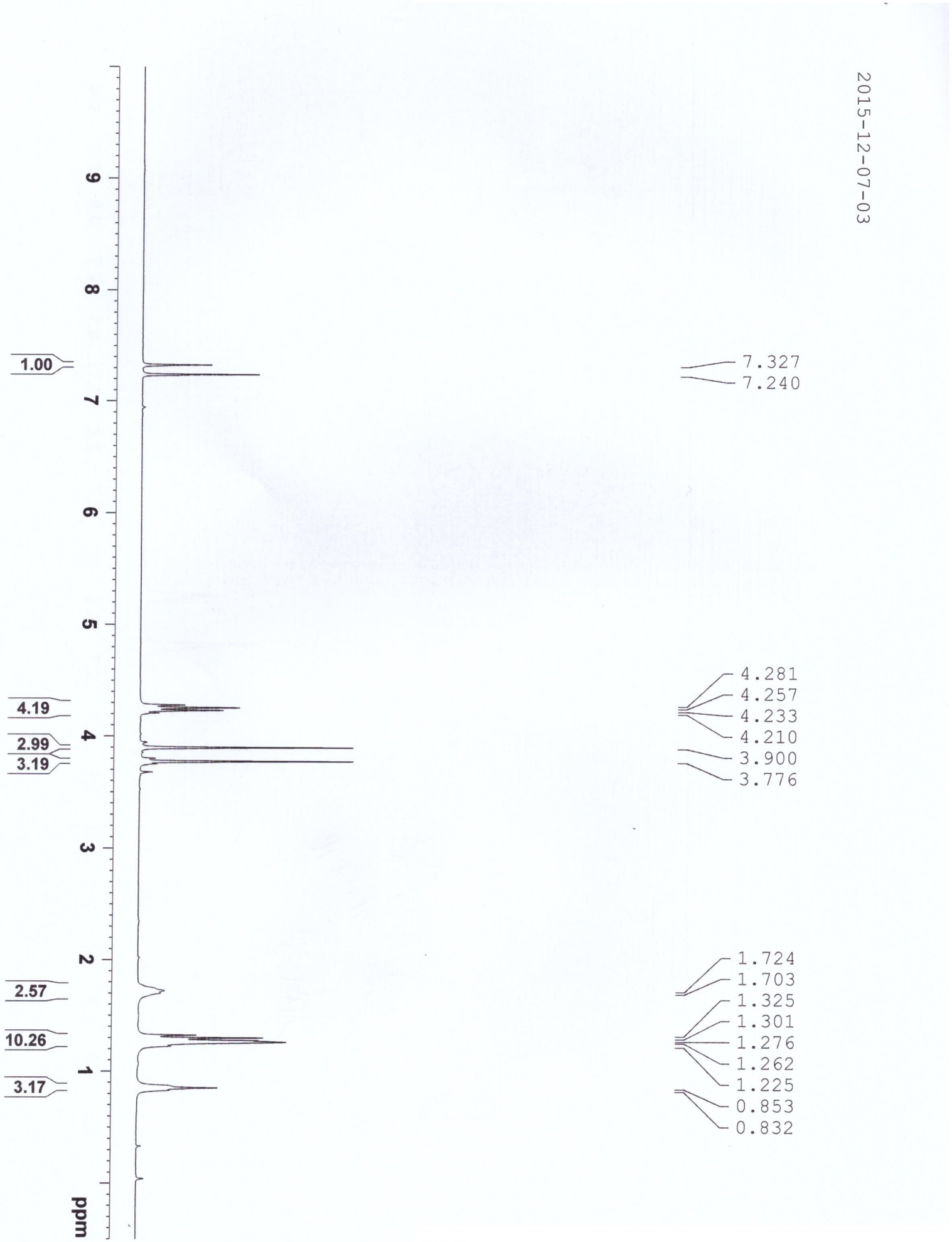
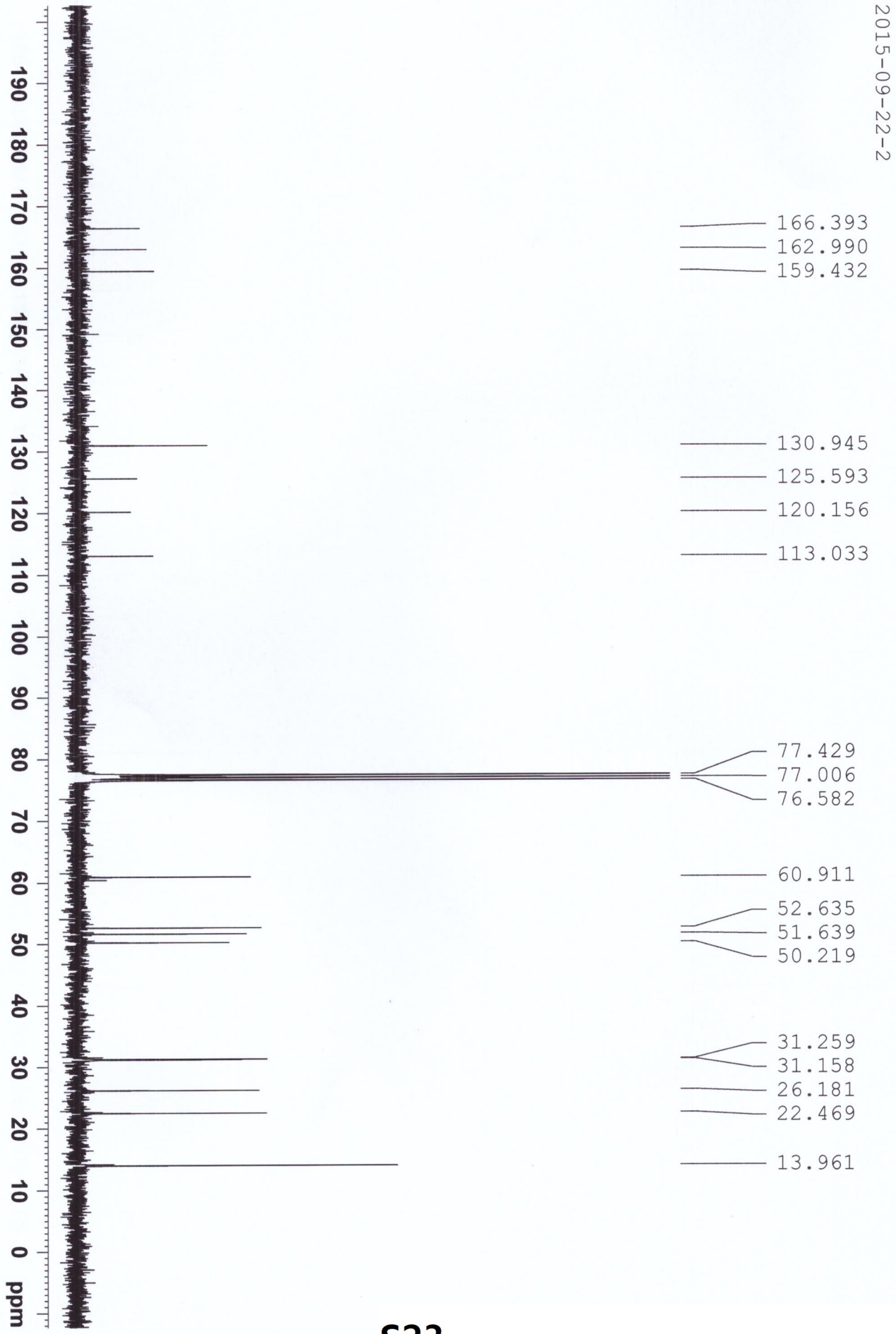
2.09
10.08
3.05
9.04
ppm


. pyrrole
Sample Name:
Data Collected on:
Agilent-NMR-vnmrs600
Archive directory:
Sample directory:
FidFile: CARBON
ulse Sequence: CARBON (s2pul)
olvent: cdcl3
ata collected on: Sep 16 2015
Temp. 25.0 C / 298.1 K
perator: vnmr1
Relax. delay 1.000 sec
Pulse 45.0 degrees
Acq. time 0.865 sec
Width 37878.8 Hz
1540 repetitions
BSERVE C13, 150.8338910 MHz
ECOUPLE H1, 599.8589194 MHz
Power 44 dB
continuously on
WALTZ-16 modulated
DATA PROCESSING
Line broadening 0.5 Hz
FT size 65536
Total time 5 hr, 10 min
200
180
160
140
120
100
80
60
40
20
ppm


2015-12-07-03
1.00
4.19
2.99
3.19
2.57
10.26
3.17
ppm
9
8
7
6
5
4
3
2
1
7.327
7.240
4.281
4.257
4.233
4.210
3.900
3.776
1.724
1.703
1.325
1.301
1.276
1.262
1.225
0.853
0.832


2015-09-22-2
166.393
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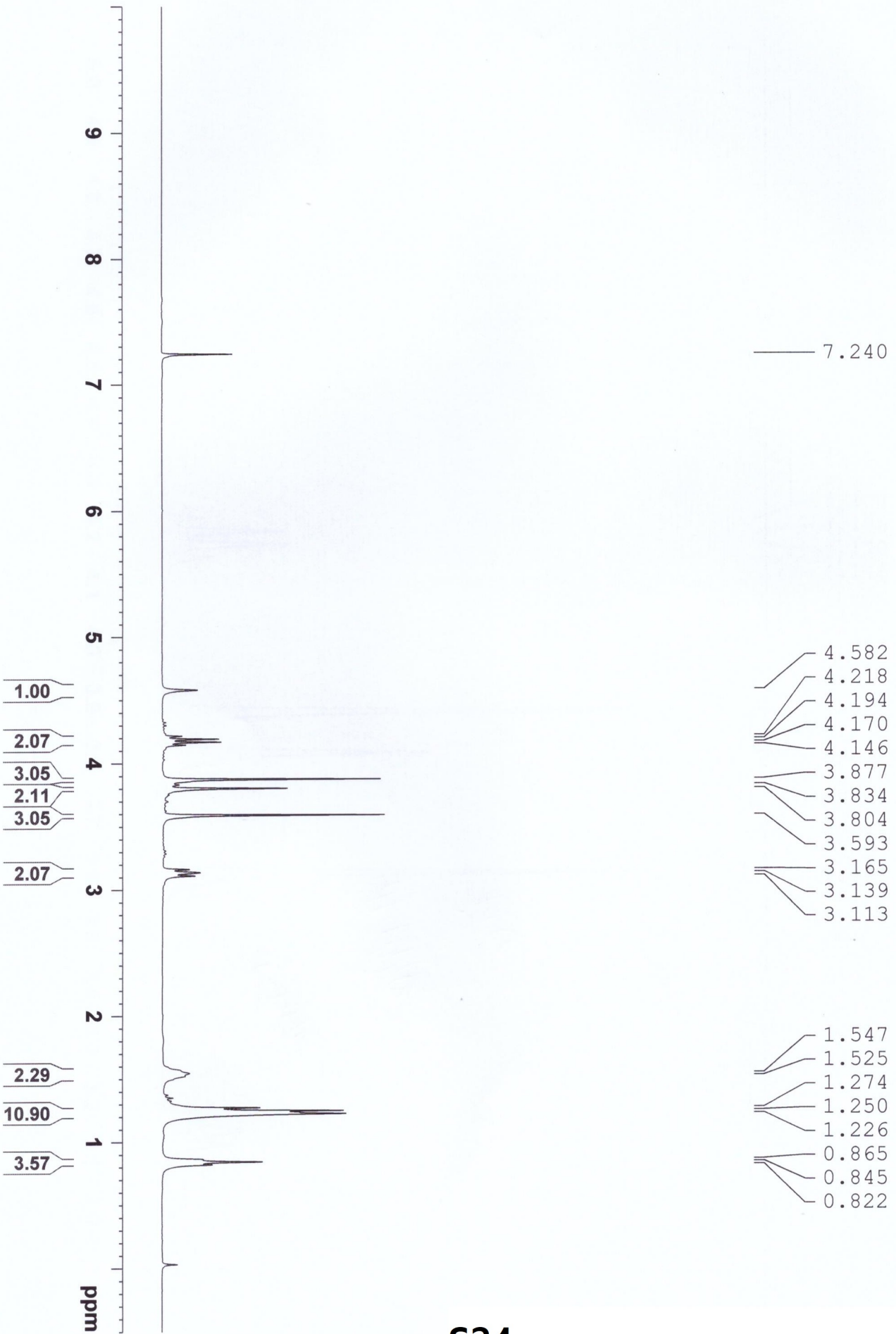
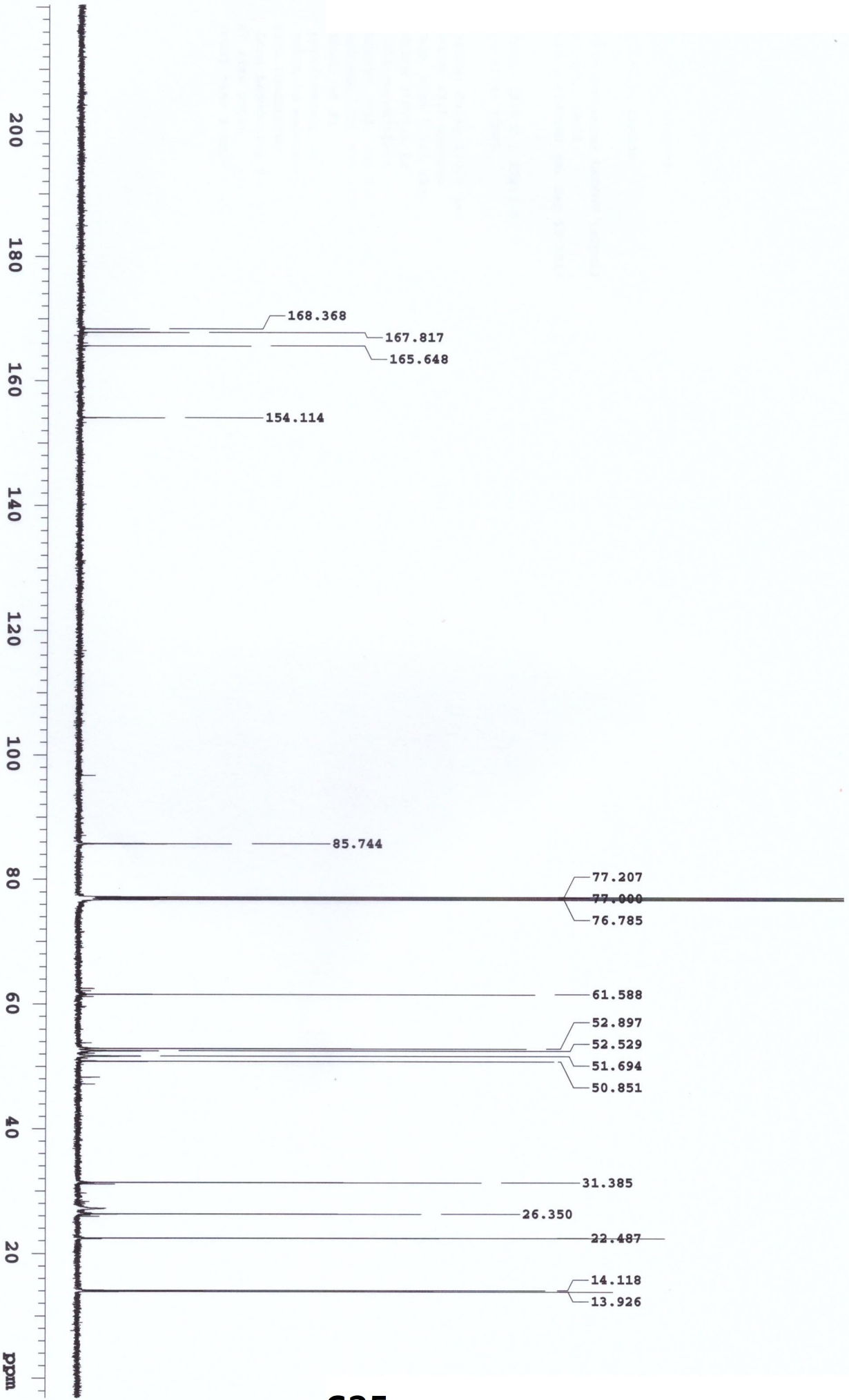
159.432
130.945
125.593
120.156
113.033
77.429
77.006
76.582
60.911
52.635
51.639
50.219
31.259
31.158
26.181
22.469
13.961
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm


2015-12-07-04
7.240
4.582
4.218
4.194
4.170
4.146
3.877
3.834
3.804
3.593
3.165
3.139
3.113
1.547
1.525
1.274
1.250
1.226
0.865
0.845
0.822
1.00
2.07
3.05
2.11
3.05
2.07
2.29
10.90
3.57
9
8
7
6
5
4
3
2
1
ppm


200
180
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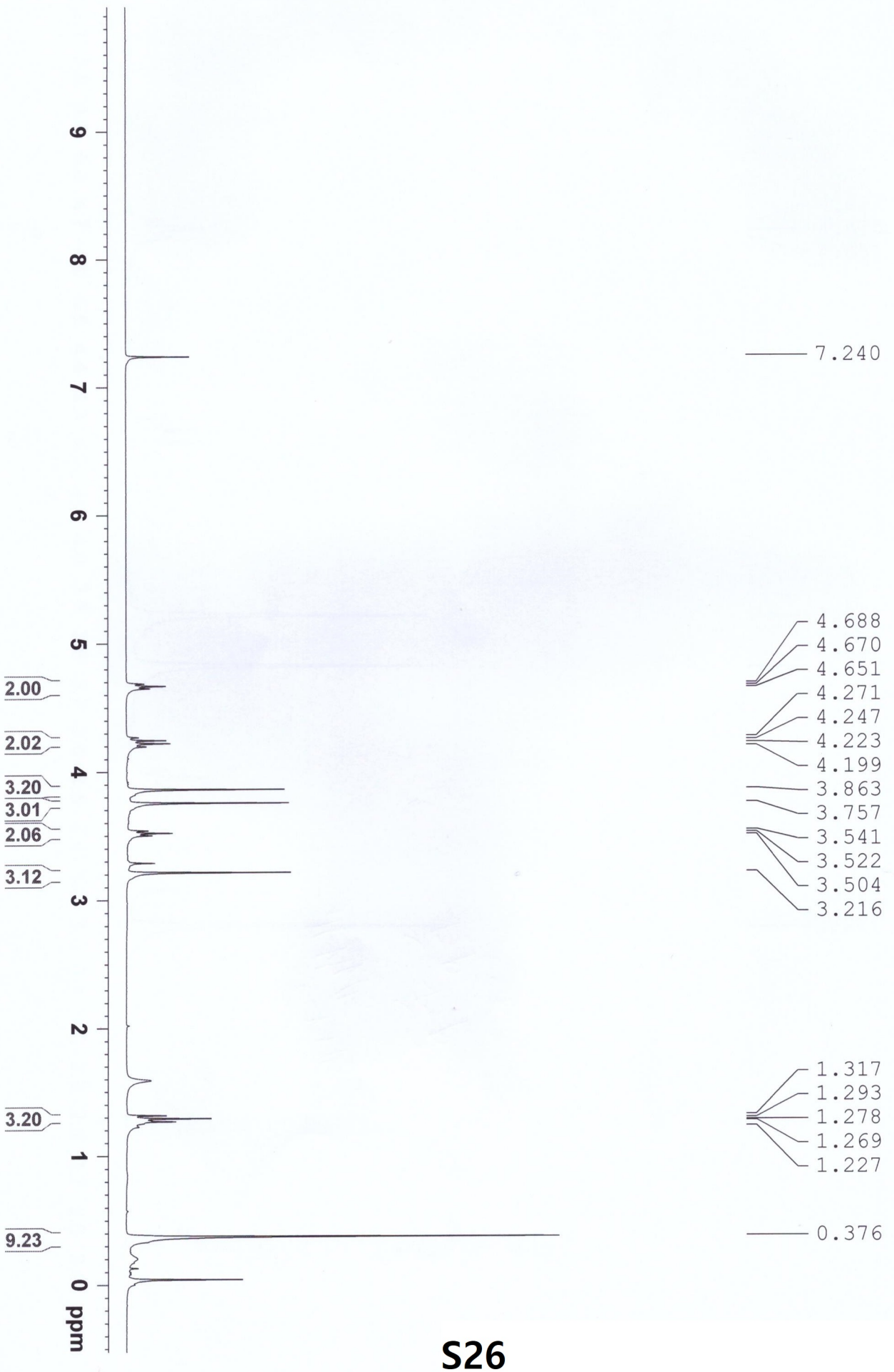
120
100
80
60
40
20
ppm
168.368
167.817
165.648
154.114
85.744
77.207
77.000
76.785
61.588
52.897
52.529
51.694
50.851
31.385
26.350
22.487
14.118
13.926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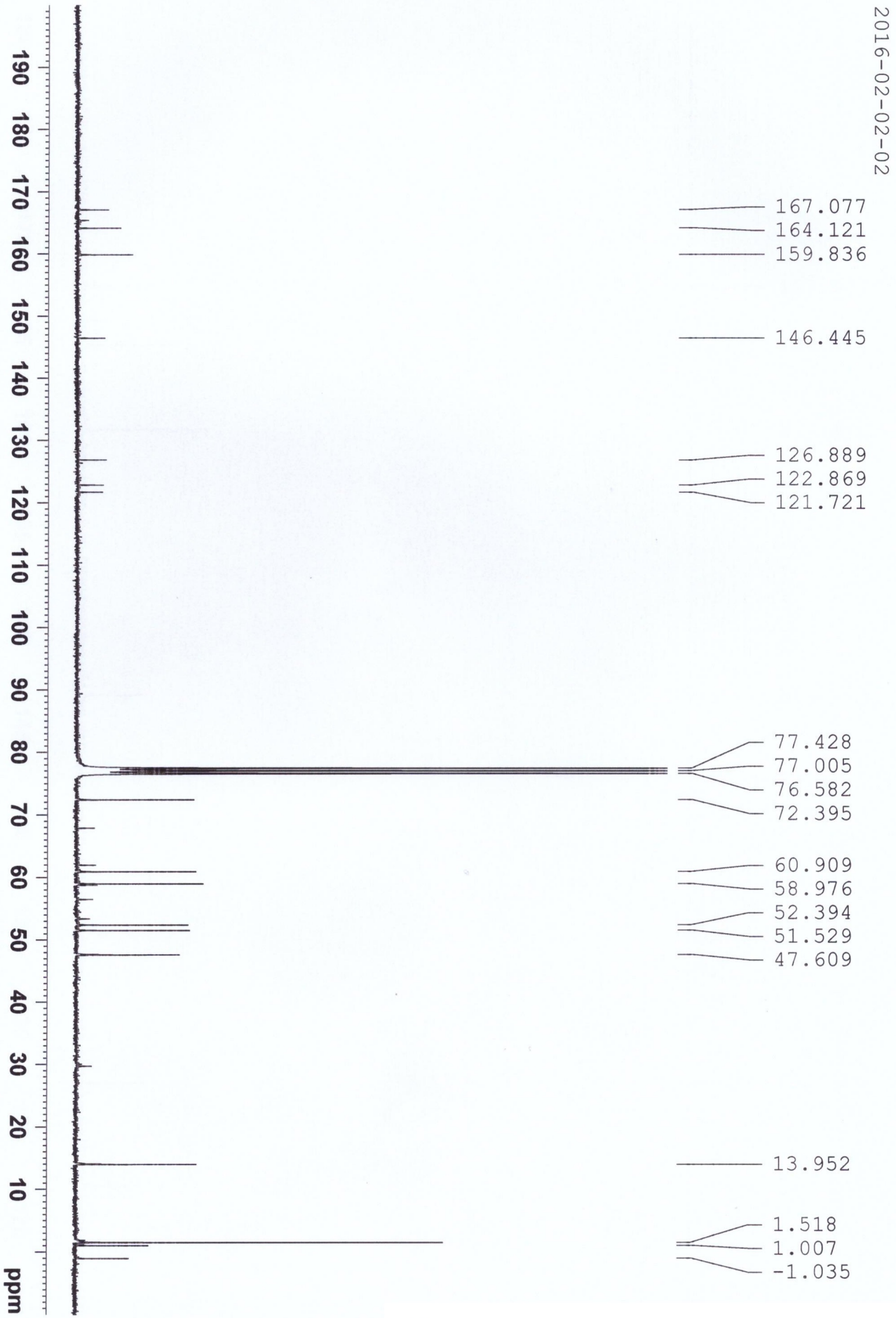
4.670
4.651
4.271
4.247
4.223
4.199
3.863
3.757
3.541
3.522
3.504
3.216
1.317
1.293
1.278
1.269
1.227
0.376
2.00
2.02
3.20
3.01
2.06
3.12
3.20
9.23
ppm


2016-02-02-02
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159.836
146.445
126.889
122.869
121.721
77.428
77.005
76.582
72.395
60.909
58.976
52.394
51.529
47.609
13.952
1.518
1.007
-1.035
190
180
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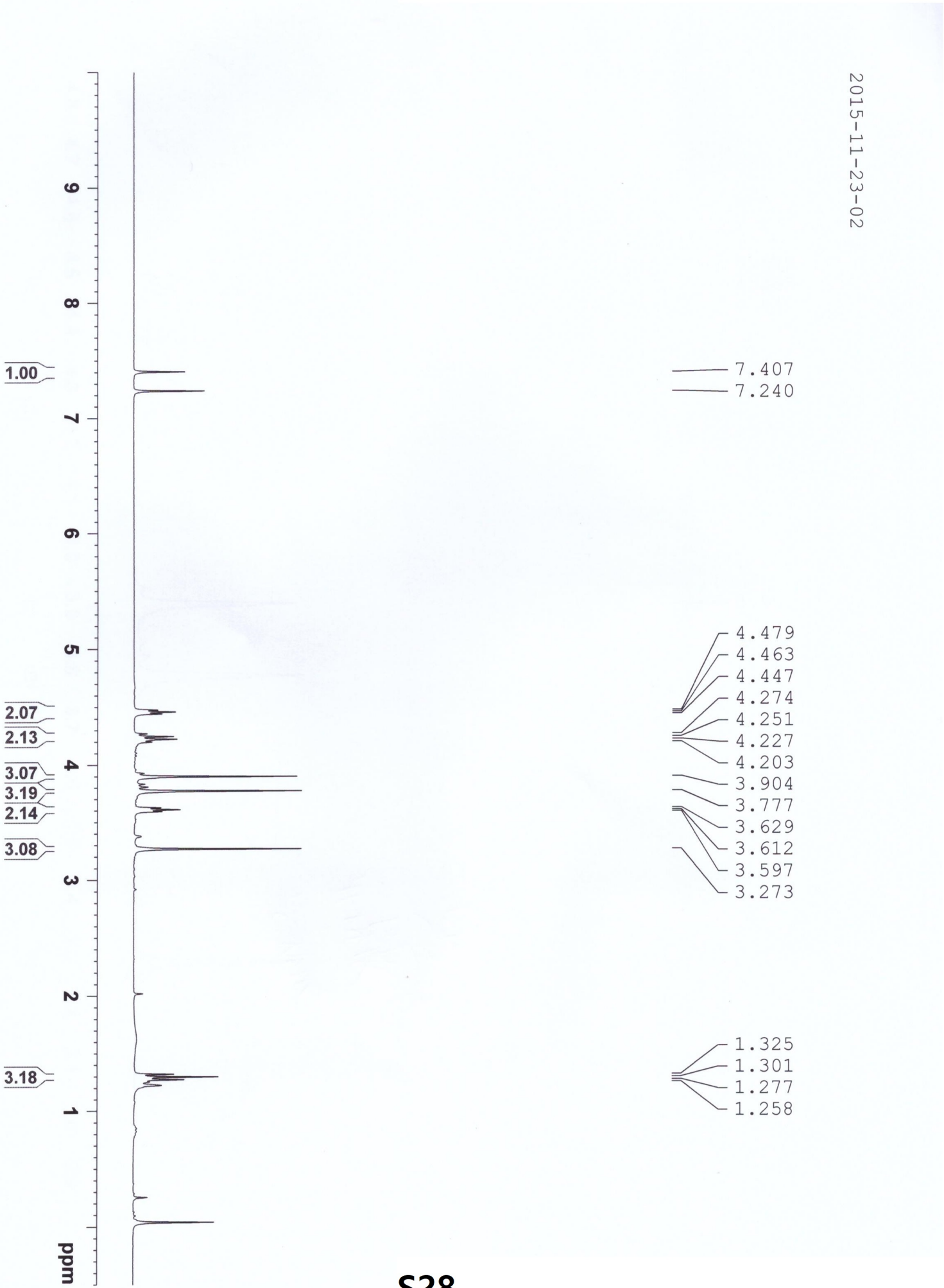
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm


2015-11-23-02
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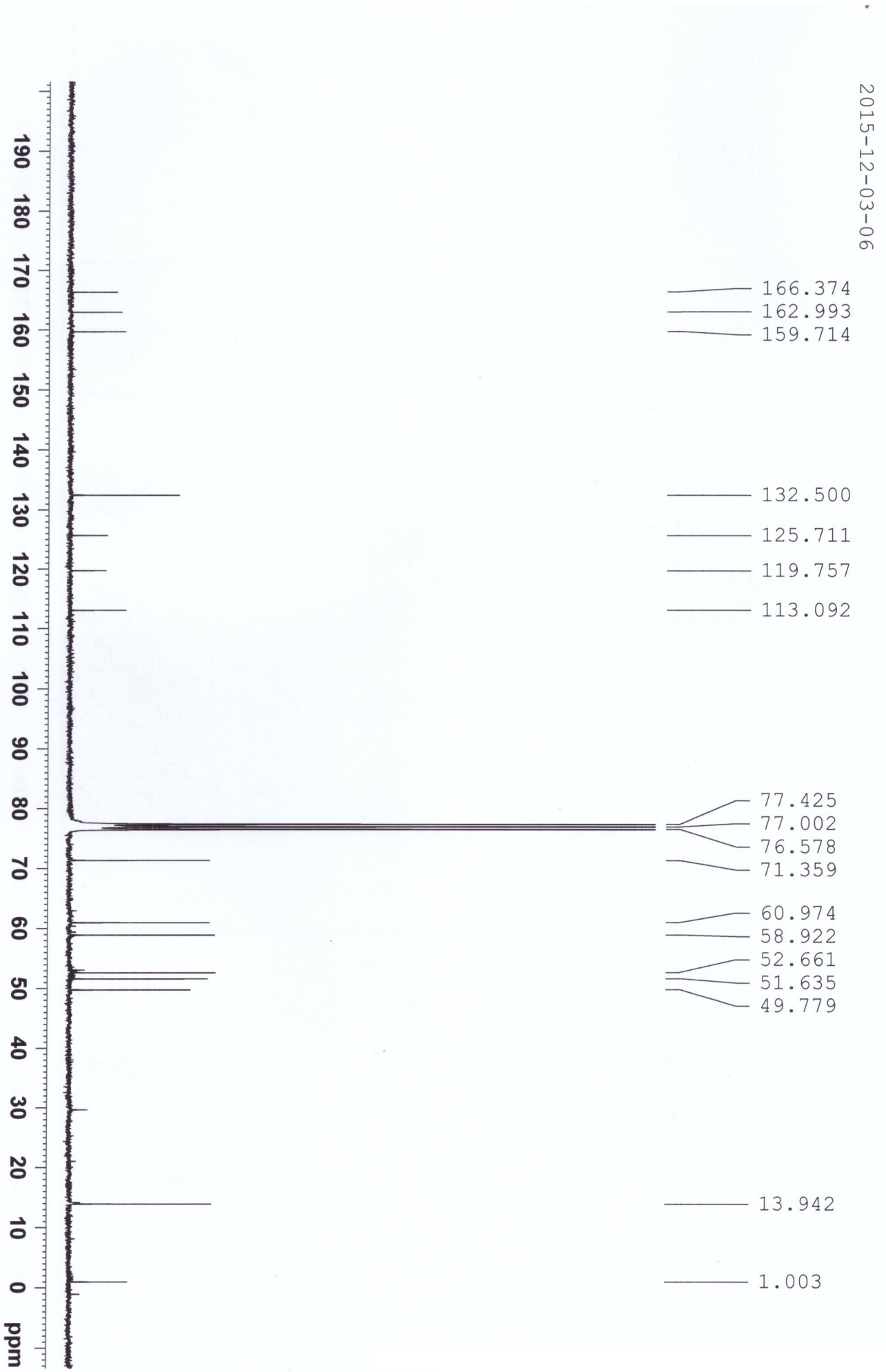
7.240
4.479
4.463
4.447
4.274
4.251
4.227
4.203
3.904
3.777
3.629
3.612
3.597
3.273
1.325
1.301
1.277
1.258
1.00
2.07
2.13
3.07
3.19
2.14
3.08
3.18
ppm


2015-12-03-06
166.374
162.993
159.714
132.500
125.711
119.757
113.092
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77.002
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71.359
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51.635
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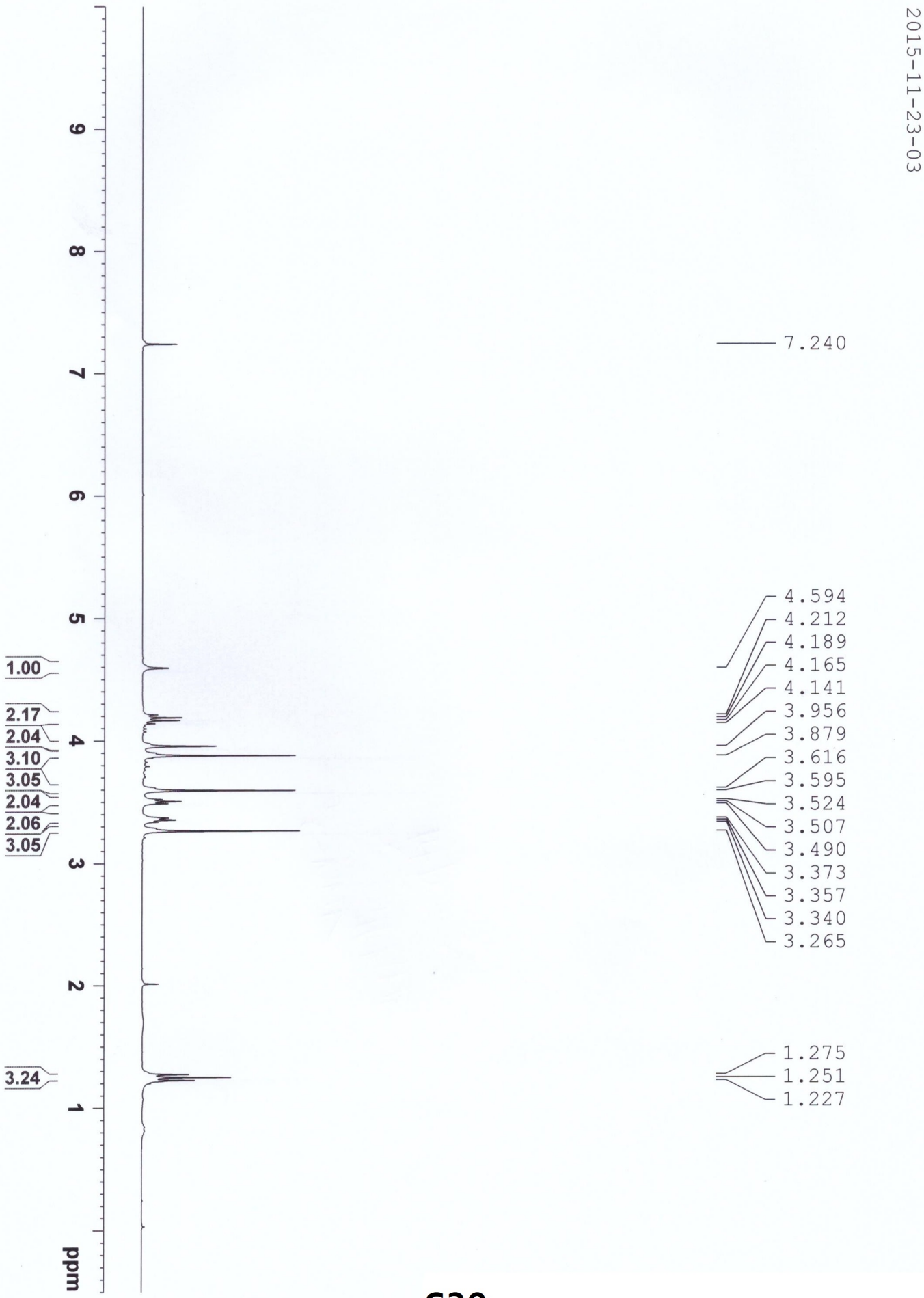
ppm


2015-11-23-03
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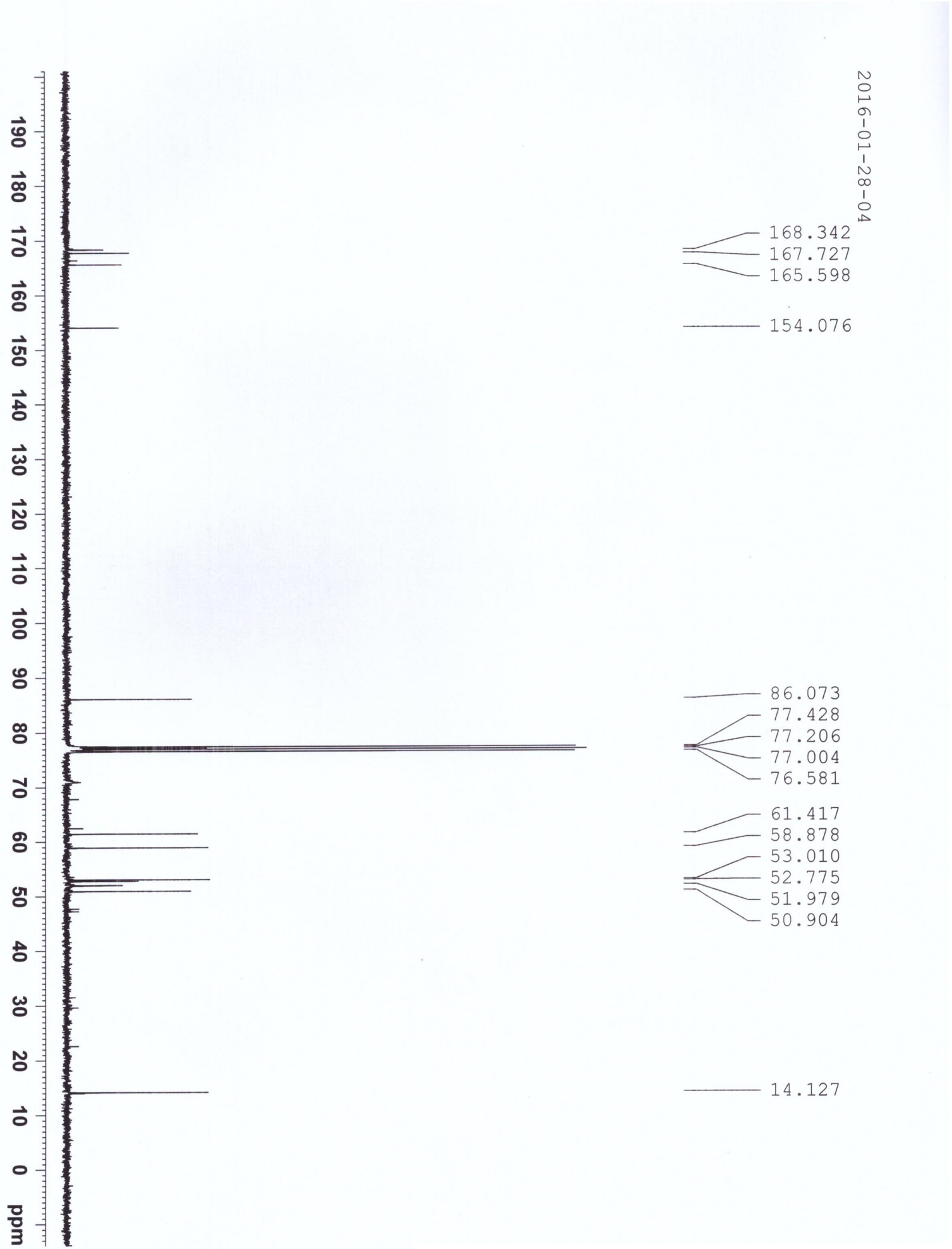
4.594
4.212
4.189
4.165
4.141
3.956
3.879
3.616
3.595
3.524
3.507
3.490
3.373
3.357
3.340
3.265
1.275
1.251
1.227
1.00
2.17
2.04
3.10
3.05
2.04
2.06
3.05
3.24
ppm


2016-01-28-04
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165.598
154.076
86.073
77.428
77.206
77.004
76.581
61.417
58.878
53.010
52.775
51.979
50.904
14.127
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140
130
120
110
100
90
80
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60
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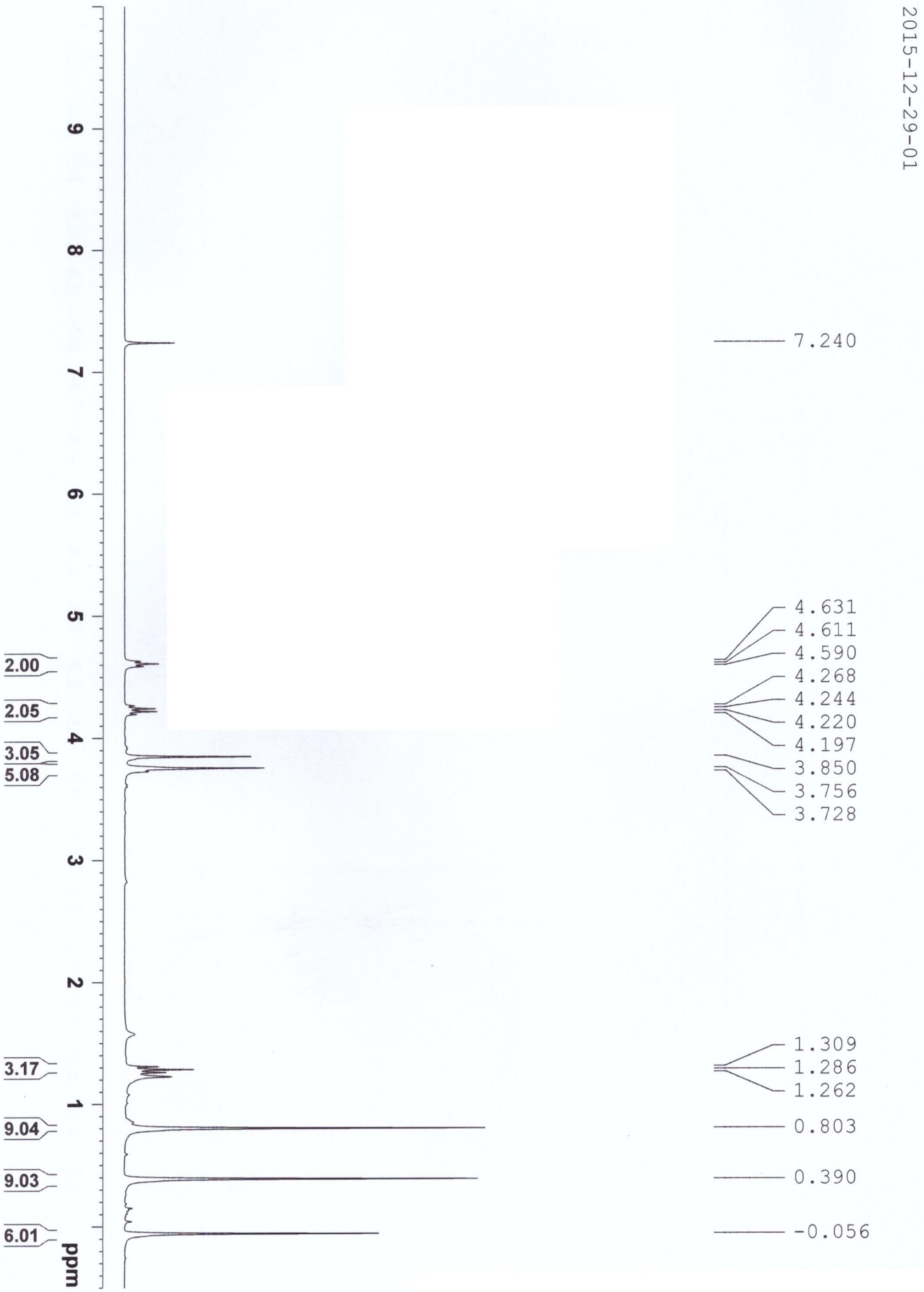
20
10
0
ppm


2015-12-29-01
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4.244
4.220
4.197
3.850
3.756
3.728
1.309
1.286
1.262
0.803
0.390
-0.056
2.00
2.05
3.05
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3.17
9.04
9.03
6.01
ppm
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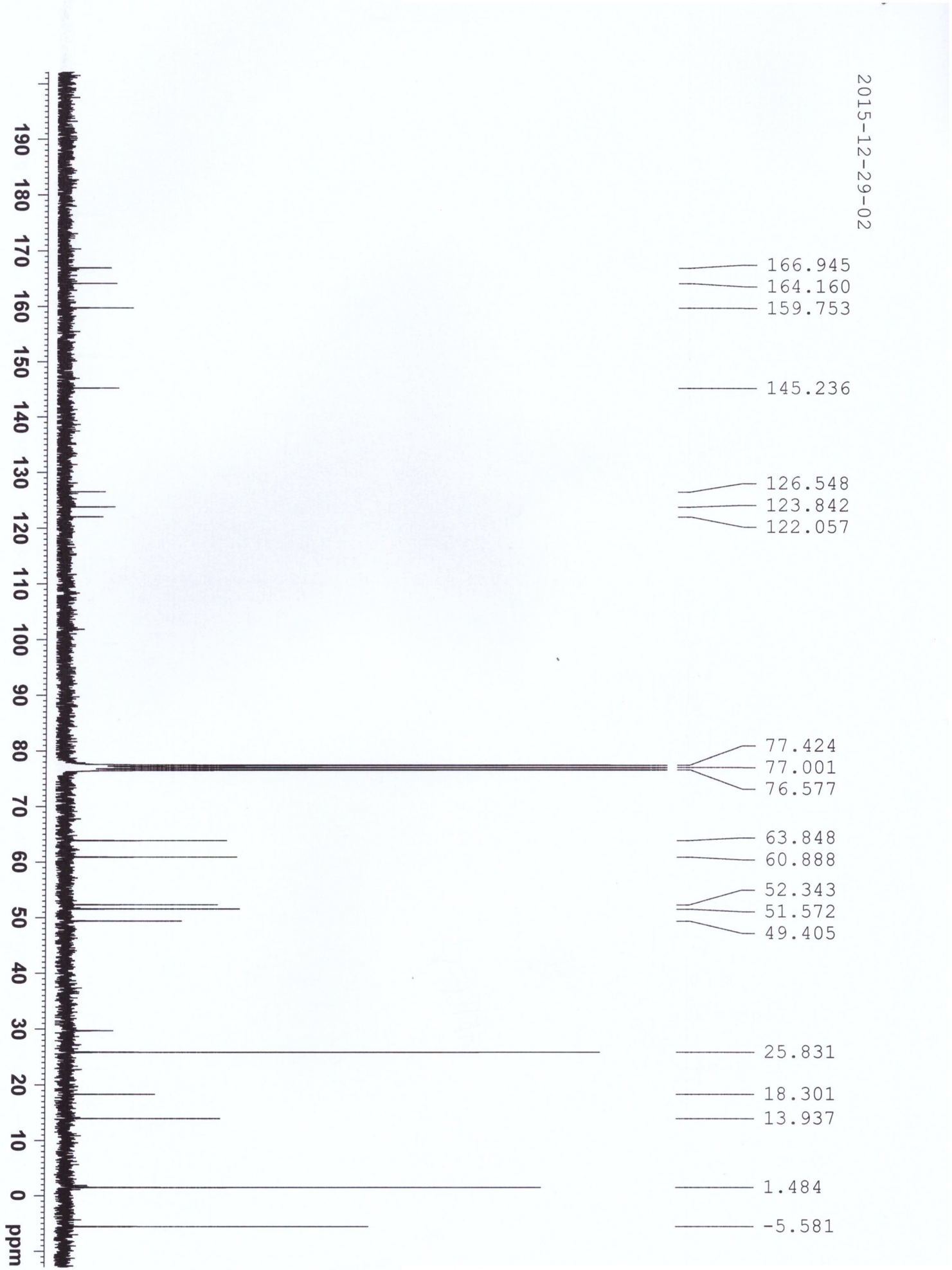
8
7
6
5
4
3
2
1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166.945
164.160
159.753
145.236
126.548
123.842
122.057
77.424
77.001
76.577
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52.343
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49.405
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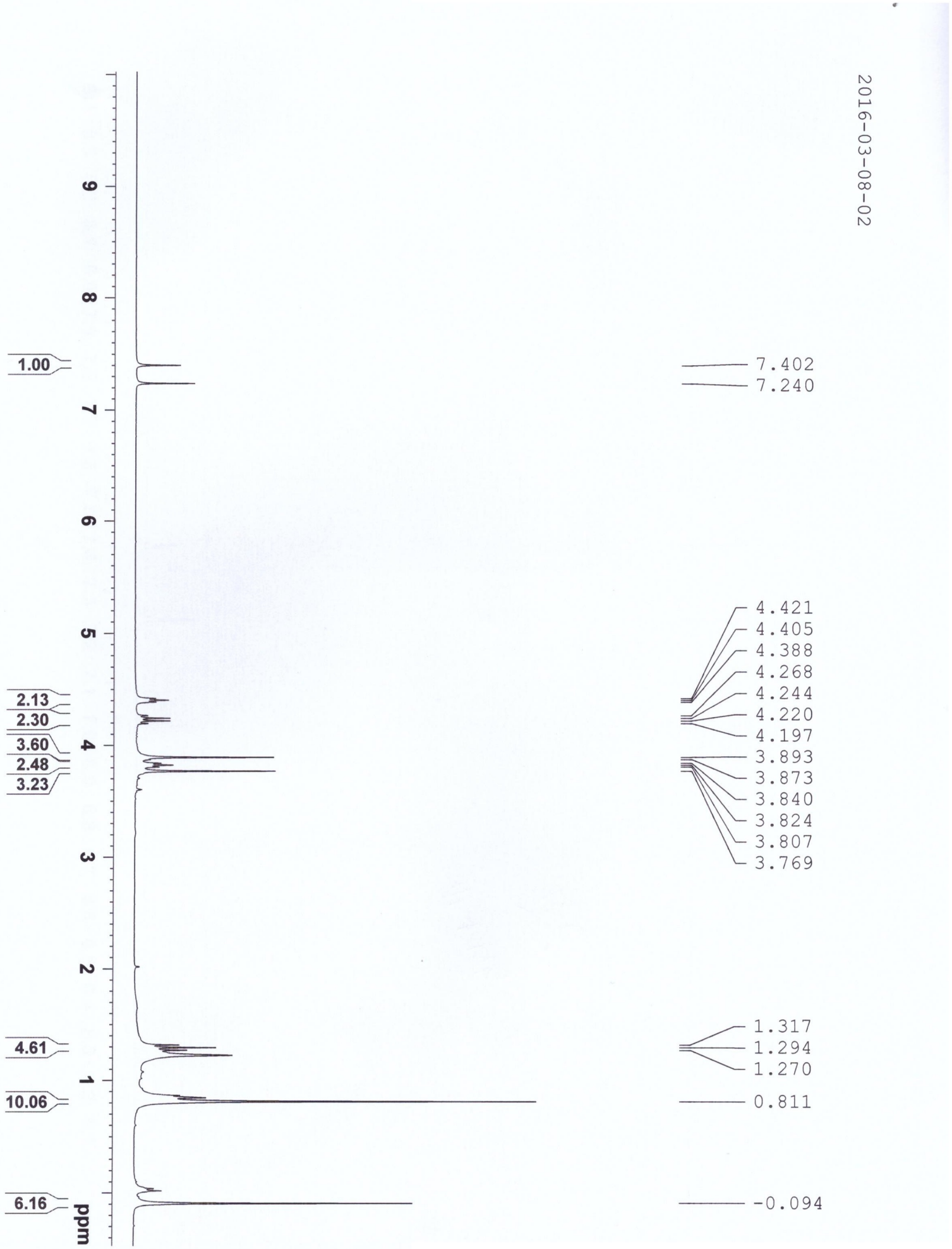
ppm


2016-03-08-02
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2.13
2.30
3.60
2.48
3.23
4.61
10.06
6.16
ppm
9
8
7
6
5
4
3
2
1
7.402
7.240
4.421
4.405
4.388
4.268
4.244
4.220
4.197
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3.840
3.824
3.807
3.769
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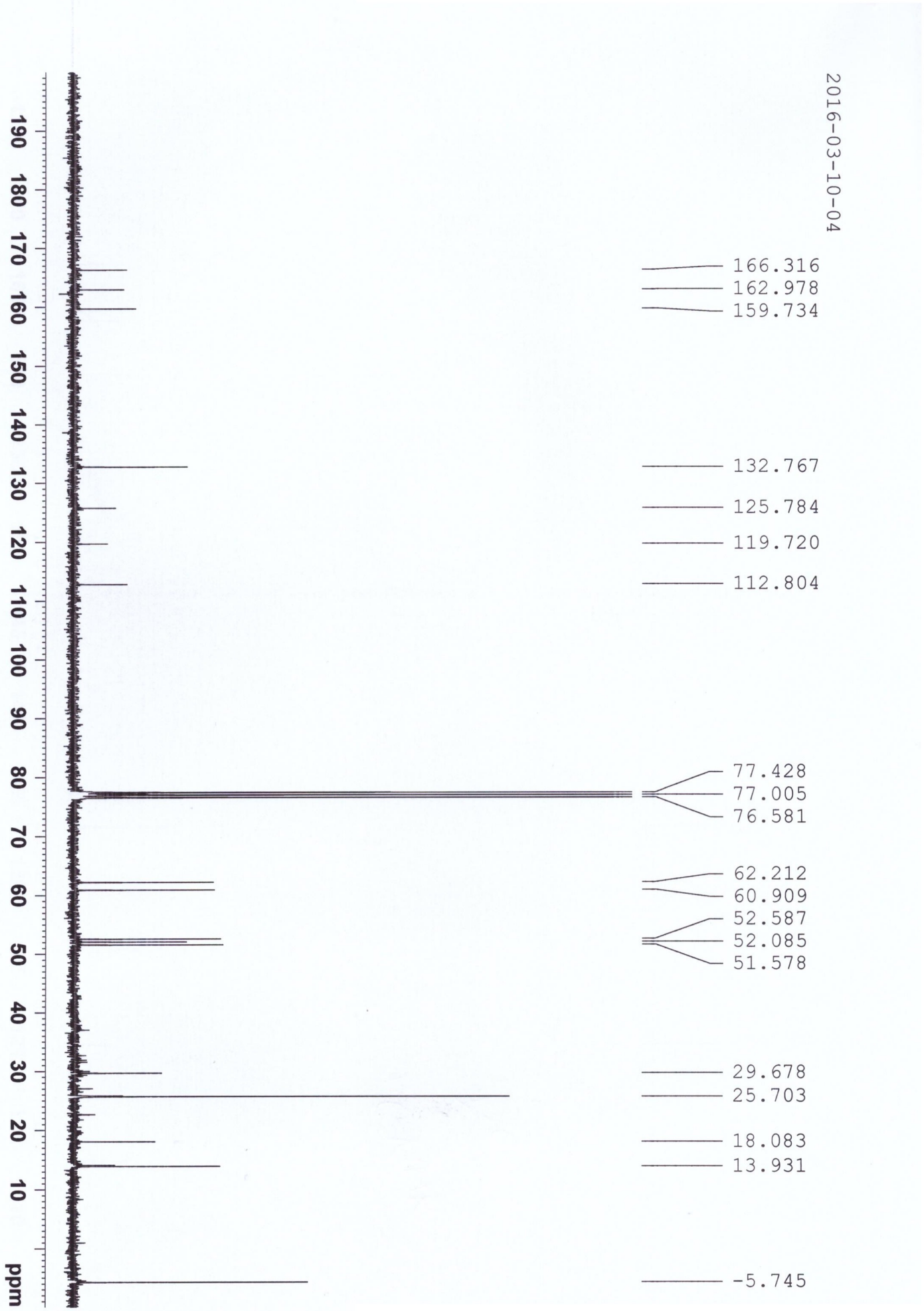
1.294
1.270
0.811
-0.094


2016-03-10-04
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132.767
125.784
119.720
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77.428
77.005
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52.587
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29.678
25.703
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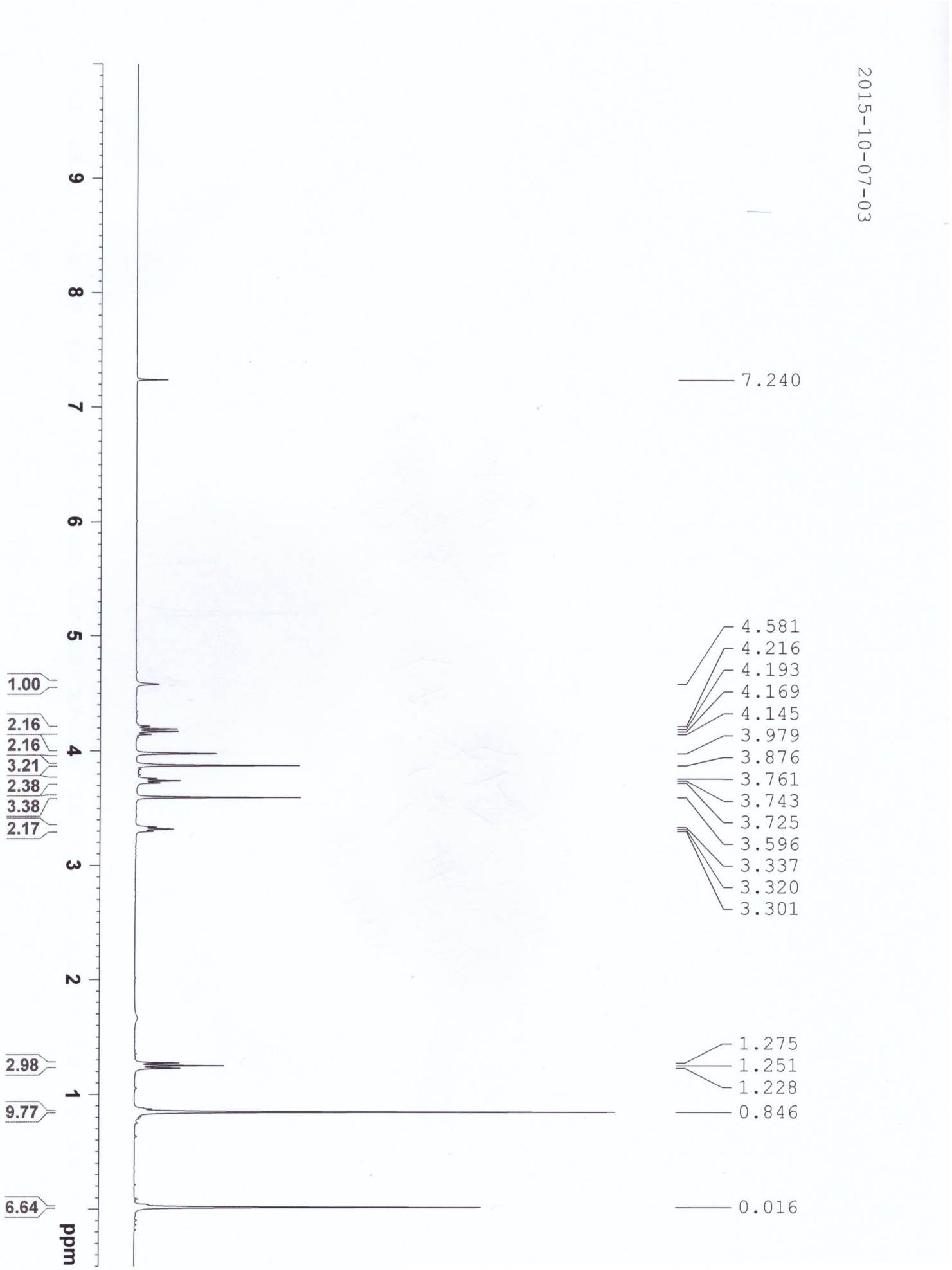
-5.745
ppm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4.169
4.145
3.979
3.876
3.761
3.743
3.725
3.596
3.337
3.320
3.301
1.275
1.251
1.228
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2.17
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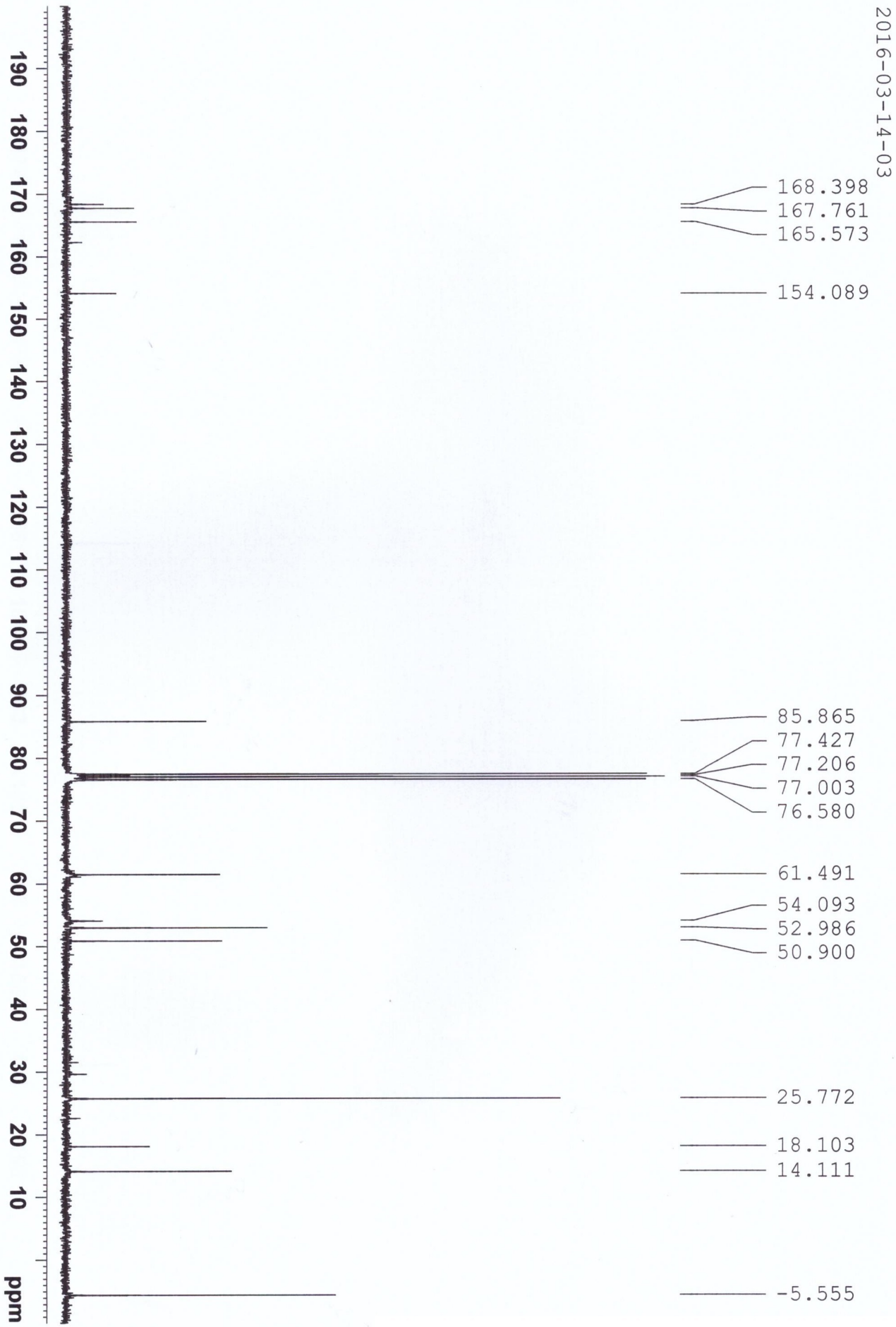
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77.003
76.580
61.491
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25.772
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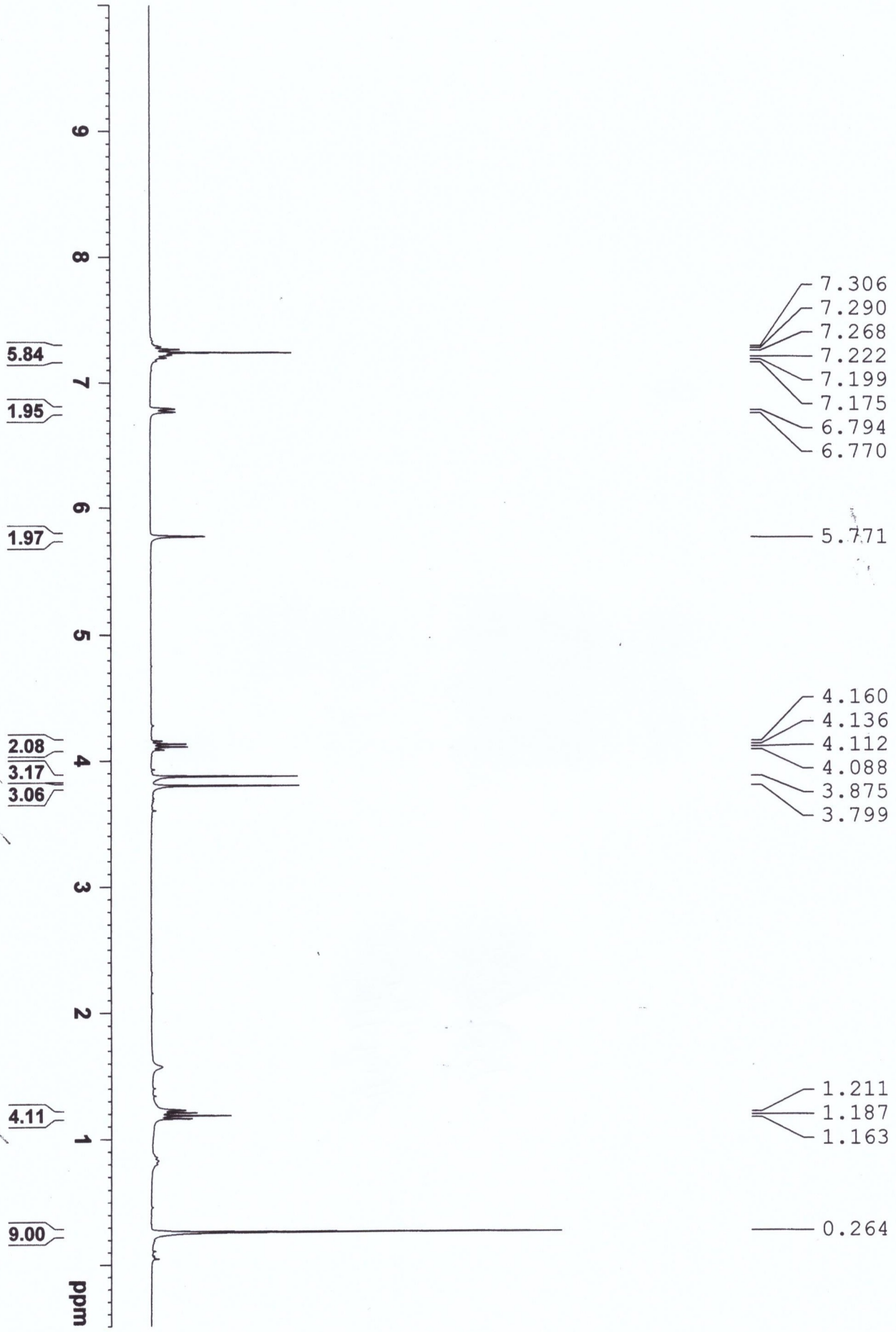
ppm


20150209-2
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6.794
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5.771
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4.112
4.088
3.875
3.799
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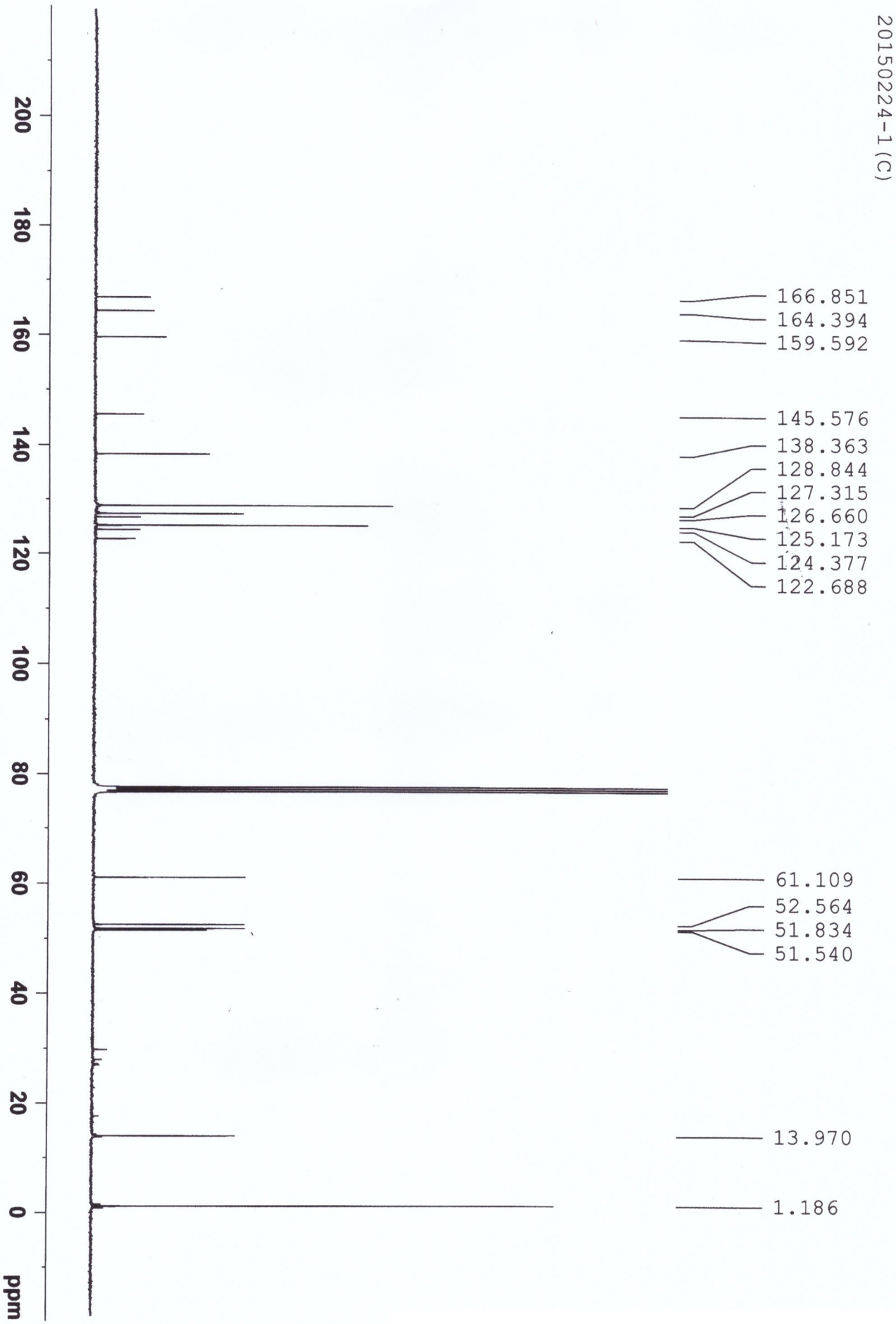
4.11
9.00
ppm


20150224-1(C)
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138.363
128.844
127.315
126.660
125.173
124.377
122.688
61.109
52.564
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13.970
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120
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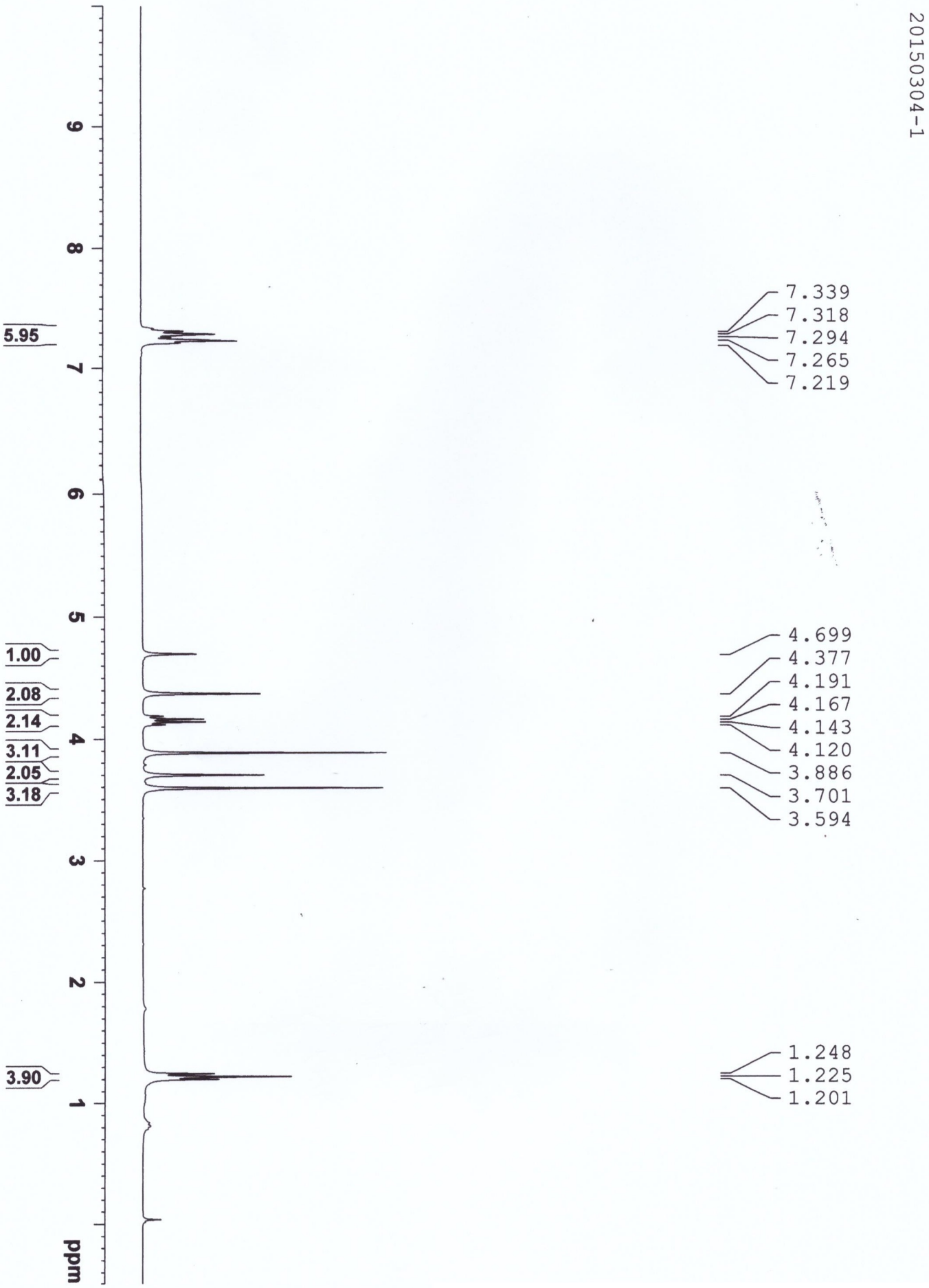
60
40
20
0
ppm


20150304-1
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4.143
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3.701
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1.201
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3.11
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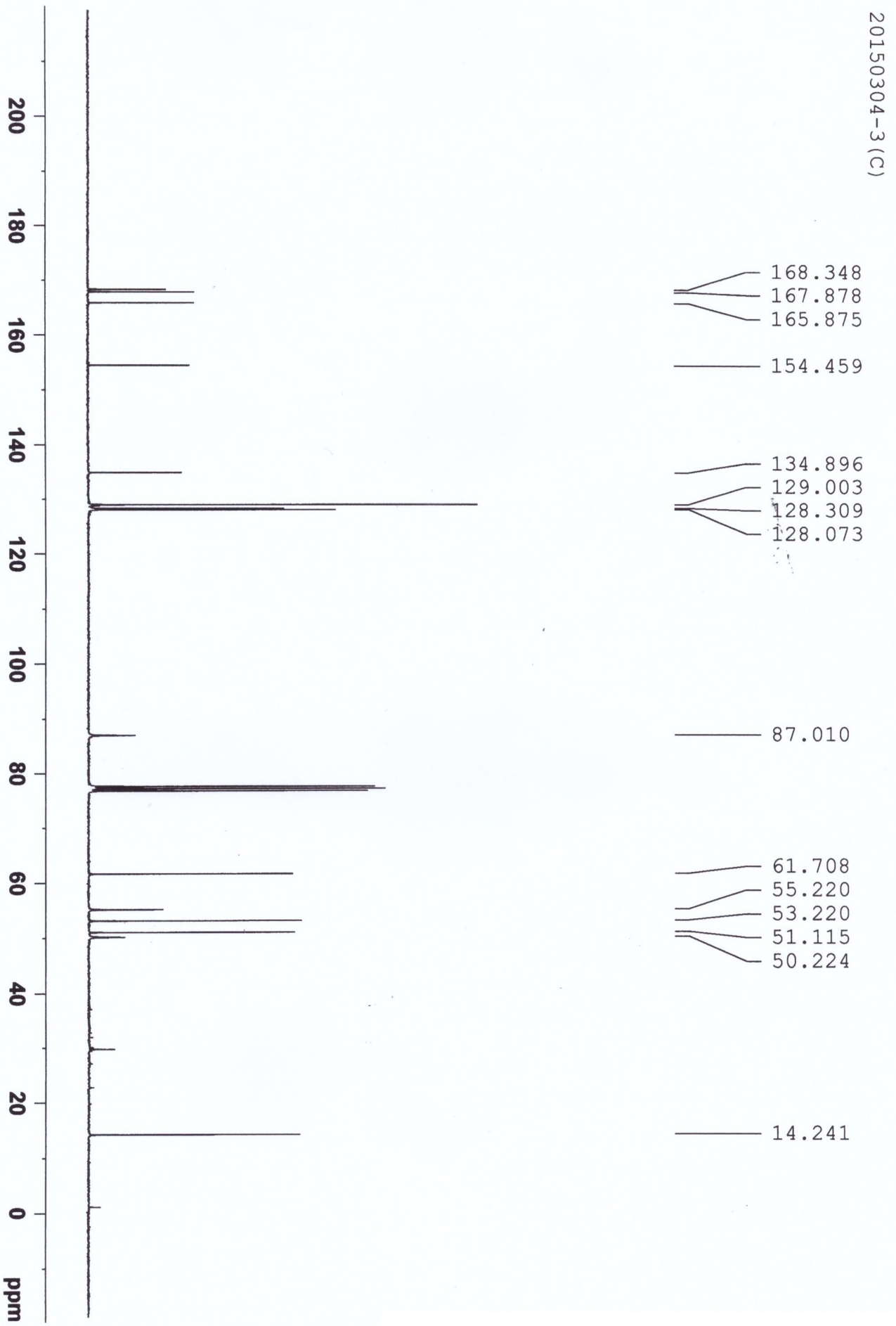
3.18
3.90
ppm


20150304-3(C)
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140
120
100
80
60
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20
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128.309
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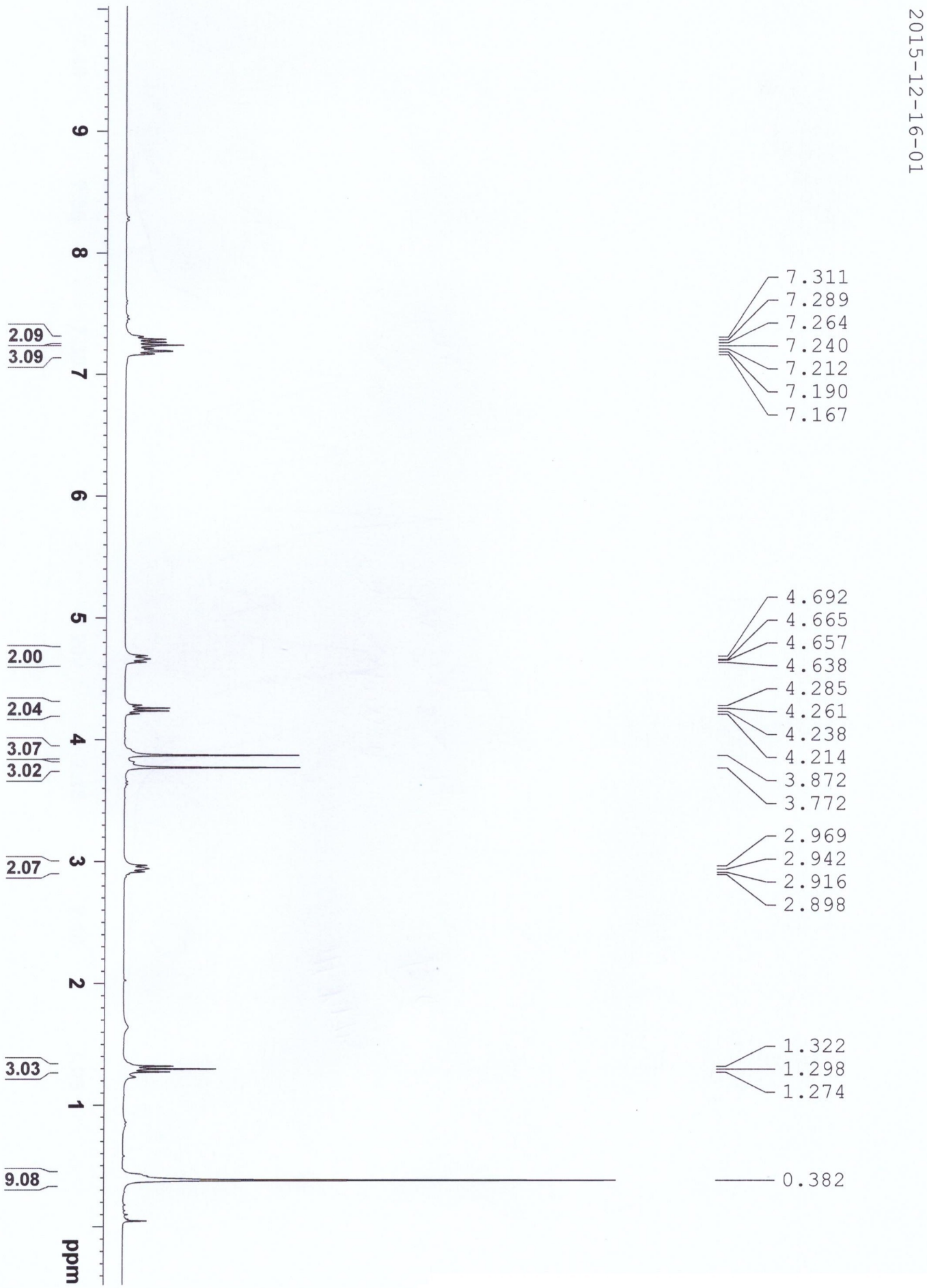
14.241


2015-12-16-01
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7.240
7.212
7.190
7.167
4.692
4.665
4.657
4.638
4.285
4.261
4.238
4.214
3.872
3.772
2.969
2.942
2.916
2.898
1.322
1.298
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3.09
2.00
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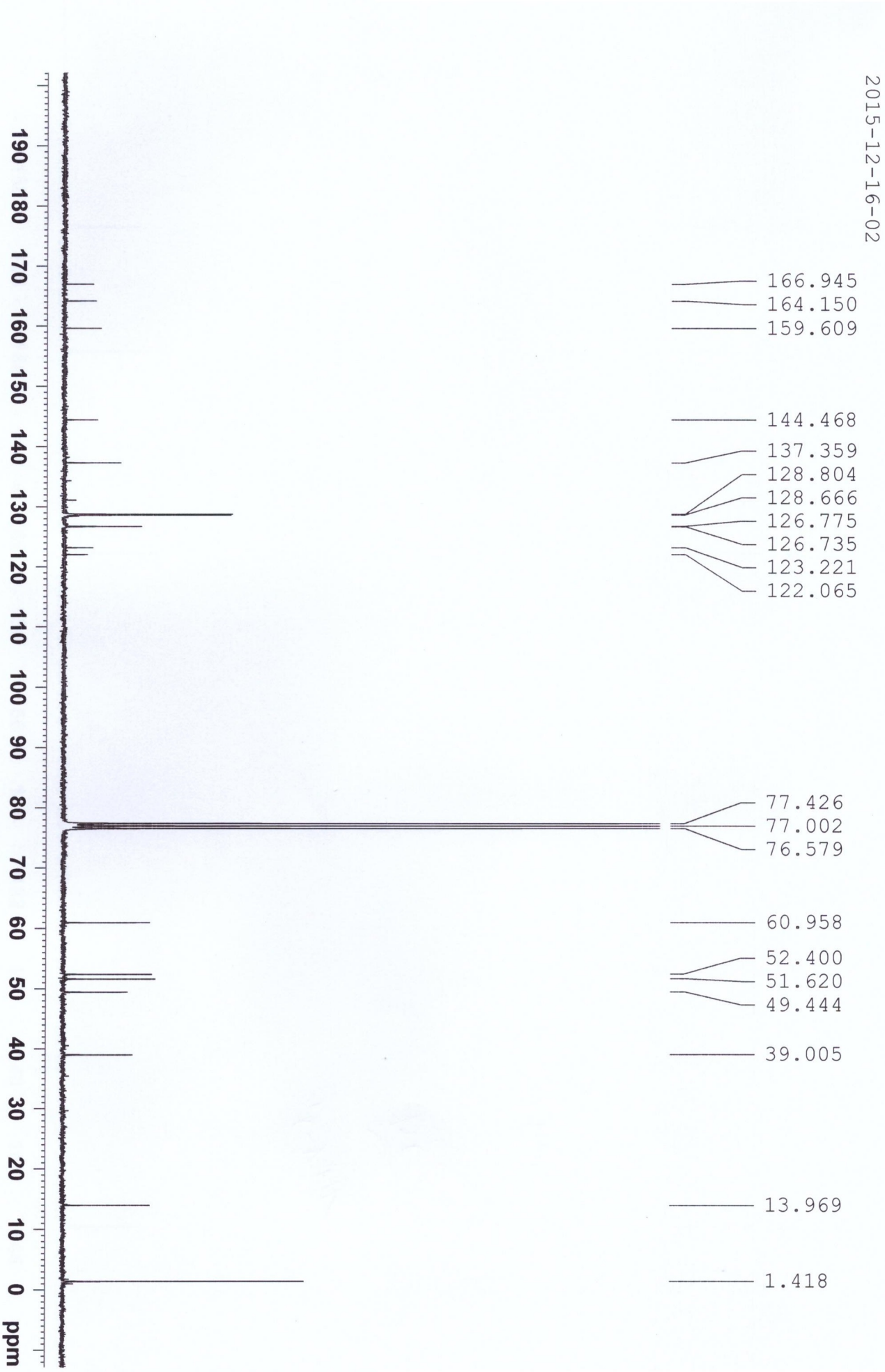
3.07
3.02
2.07
3.03
9.08
ppm


2015-12-16-02
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159.609
144.468
137.359
128.804
128.666
126.775
126.735
123.221
122.065
77.426
77.002
76.579
60.958
52.400
51.620
49.444
39.005
13.969
1.418
190
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120
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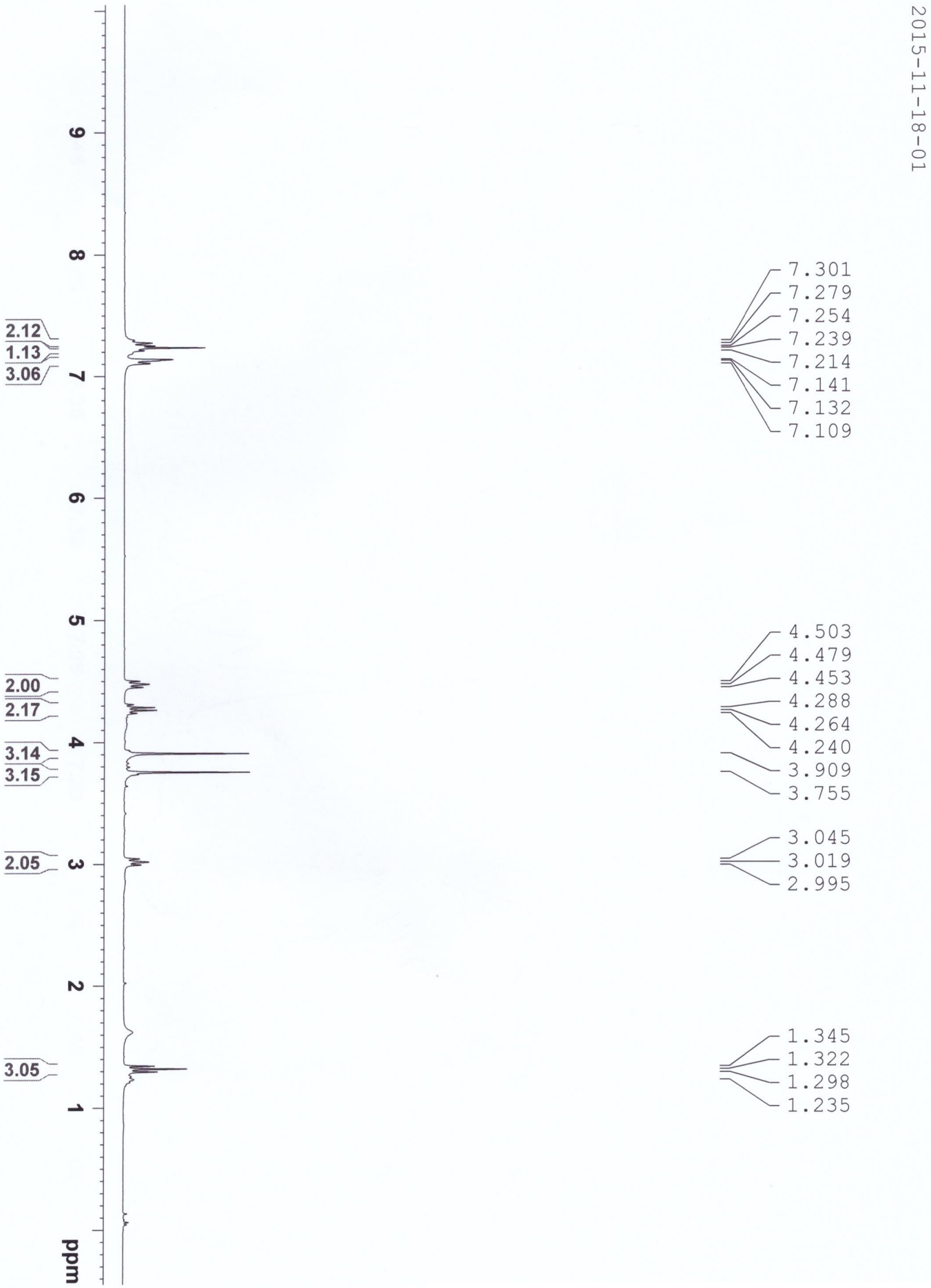
ppm


2015-11-18-01
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7.254
7.239
7.214
7.141
7.132
7.109
4.503
4.479
4.453
4.288
4.264
4.240
3.909
3.755
3.045
3.019
2.995
1.345
1.322
1.298
1.235
2.12
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2.17
3.14
3.15
2.05
3.05
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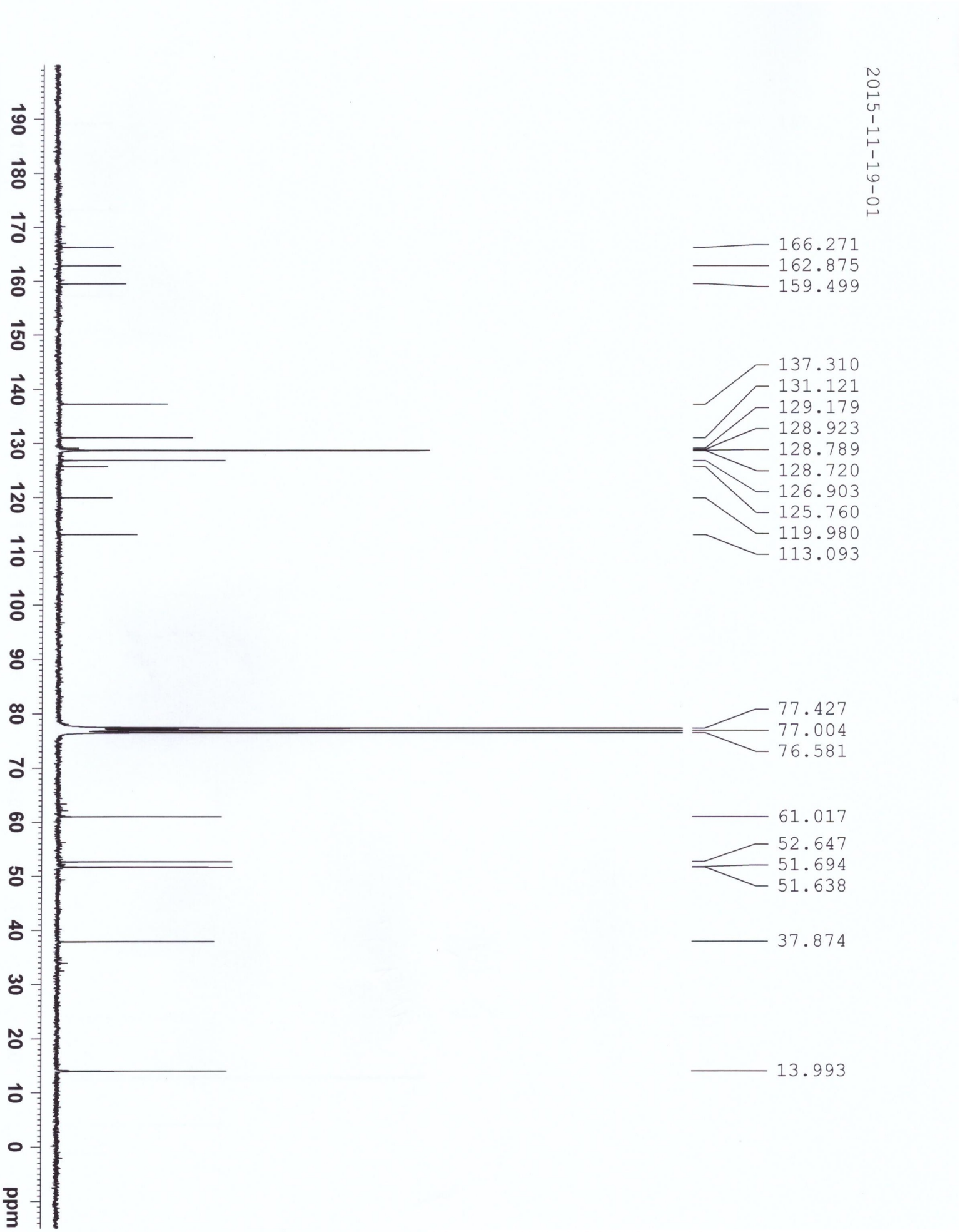
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166.271
162.875
159.499
137.310
131.121
129.179
128.923
128.789
128.720
126.903
125.760
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77.004
76.581
61.017
52.647
51.694
51.638
37.874
13.993
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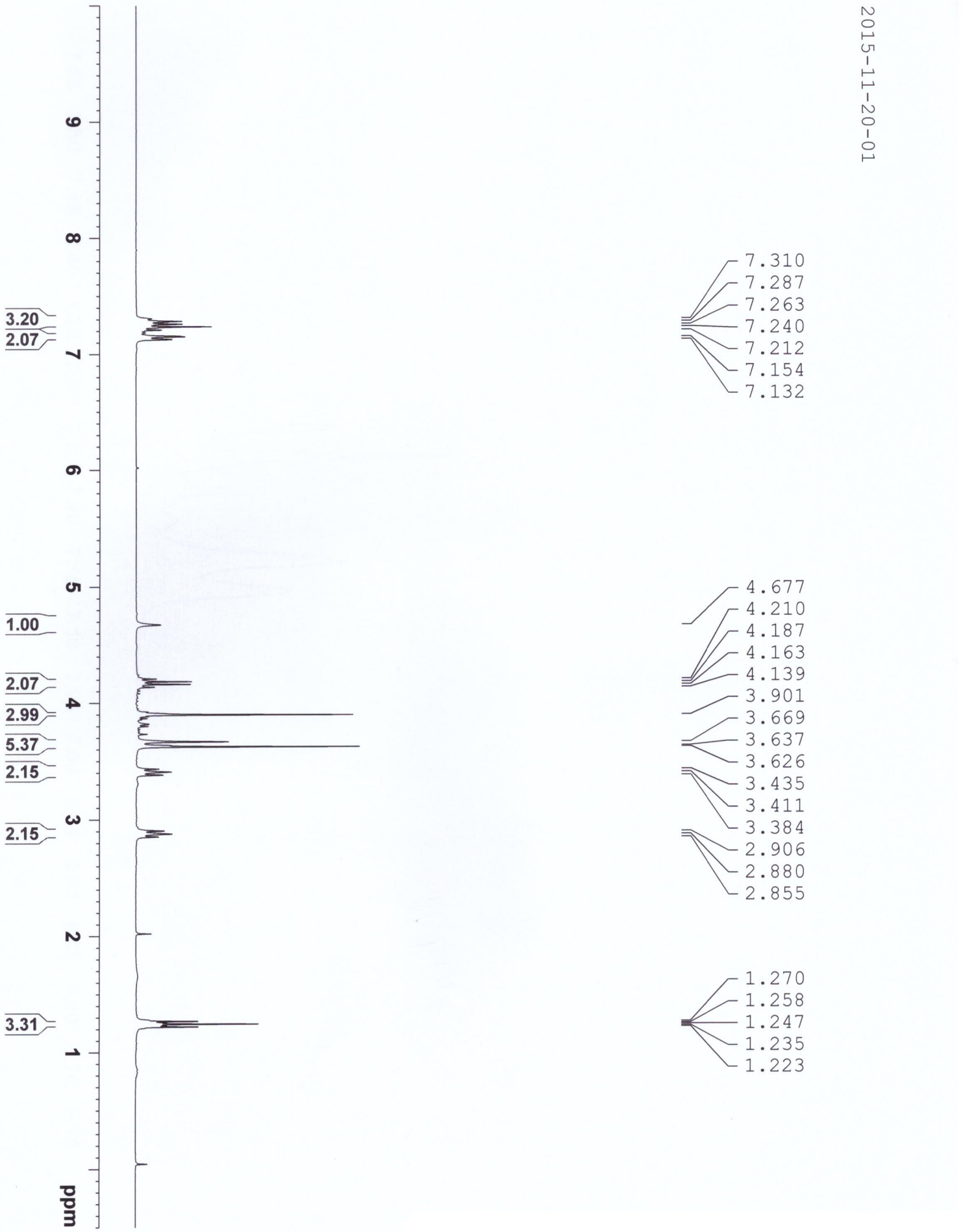
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7.310
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7.132
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4.210
4.187
4.163
4.139
3.901
3.669
3.637
3.626
3.435
3.411
3.384
2.906
2.880
2.855
1.270
1.258
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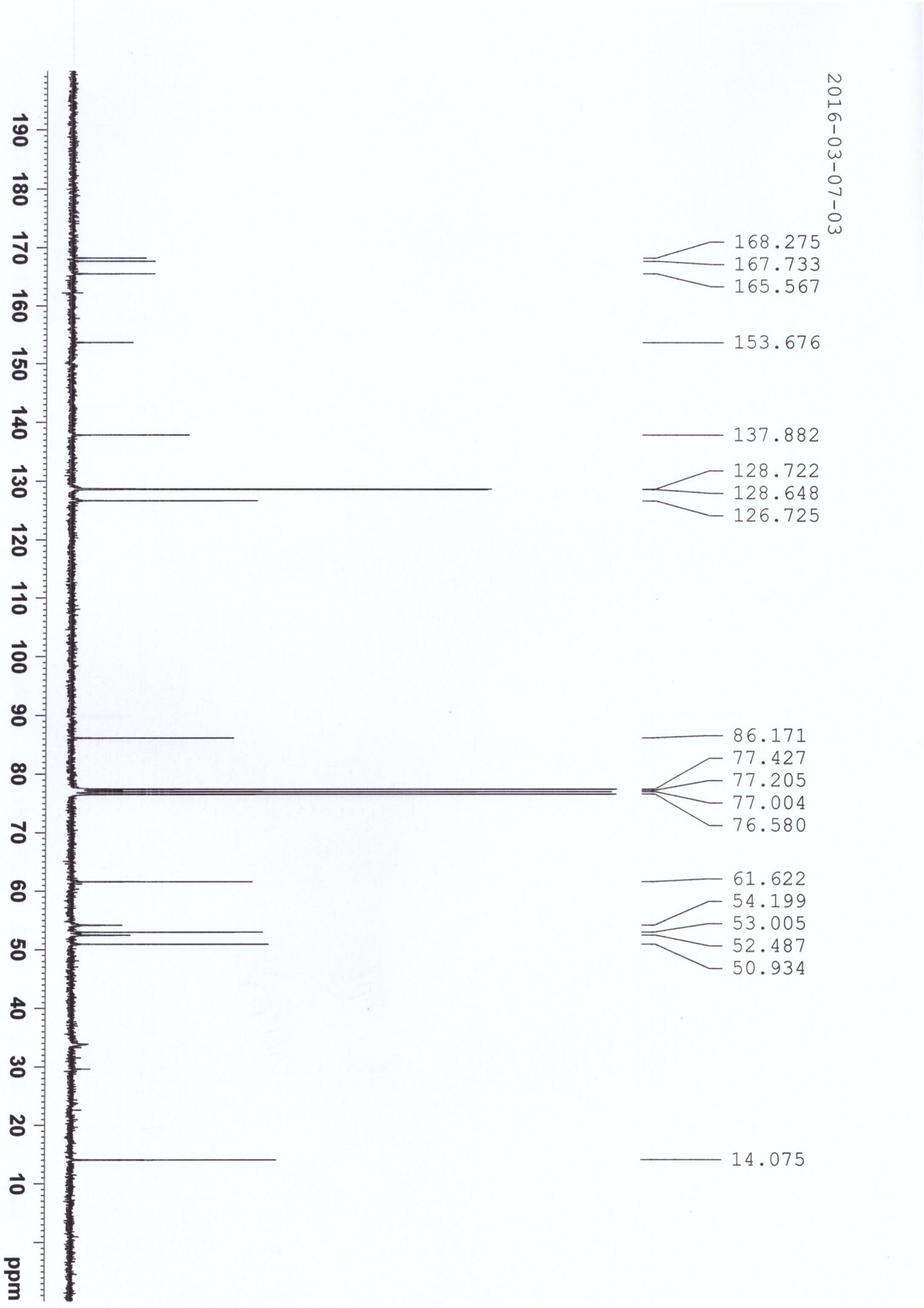
2016-03-07-03
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167.733
165.567
153.676
137.882
128.722
128.648
126.725
86.171
77.427
77.205
77.004
76.580
61.622
54.199
53.005
52.487
50.934
14.075
190
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150
140
130
120
110
100
90
80
70
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30
20
10
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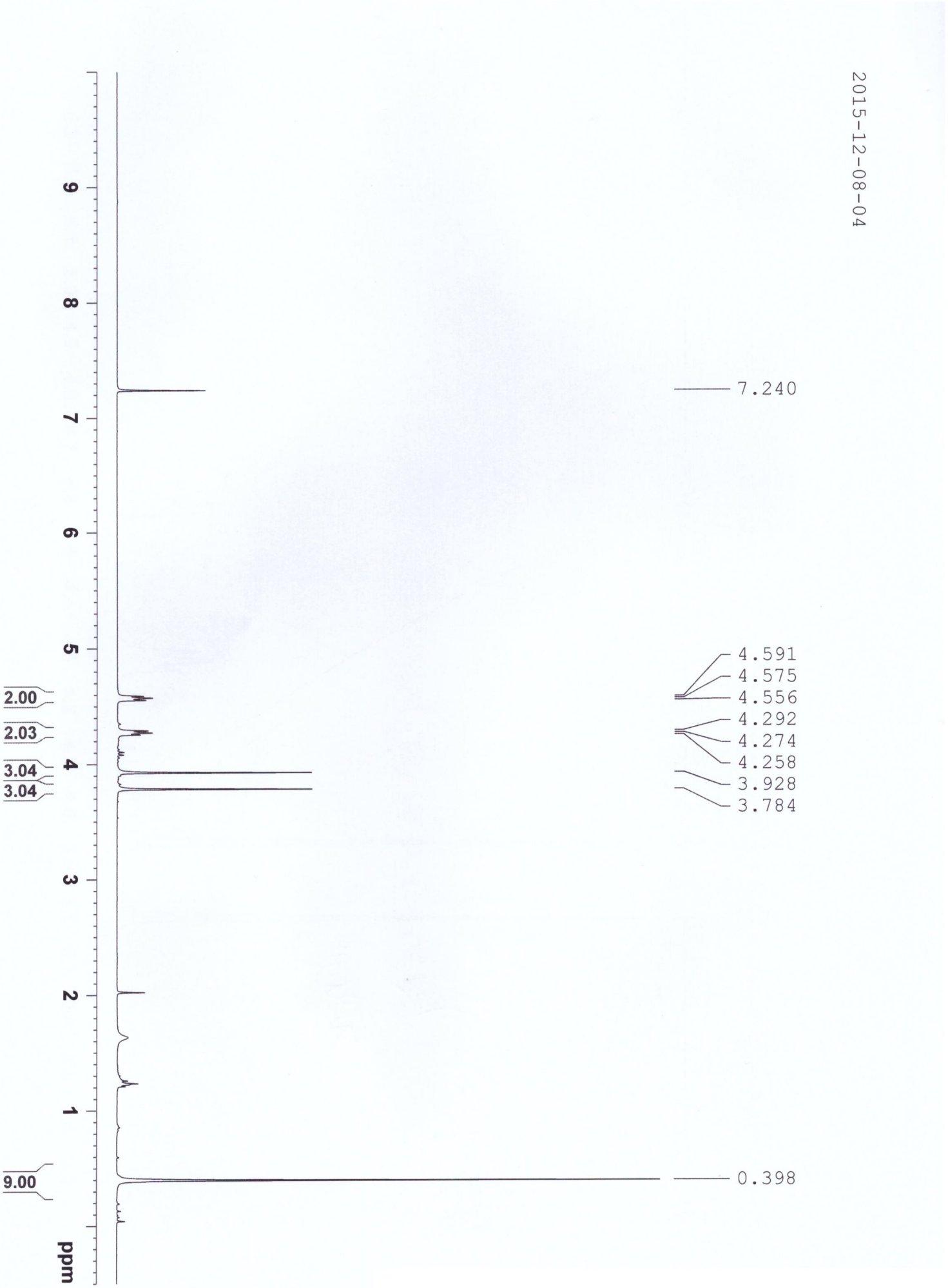
2015-12-08-04
7.240
4.591
4.575
4.556
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4.258
3.928
3.784
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2.03
3.04
3.04
9.00
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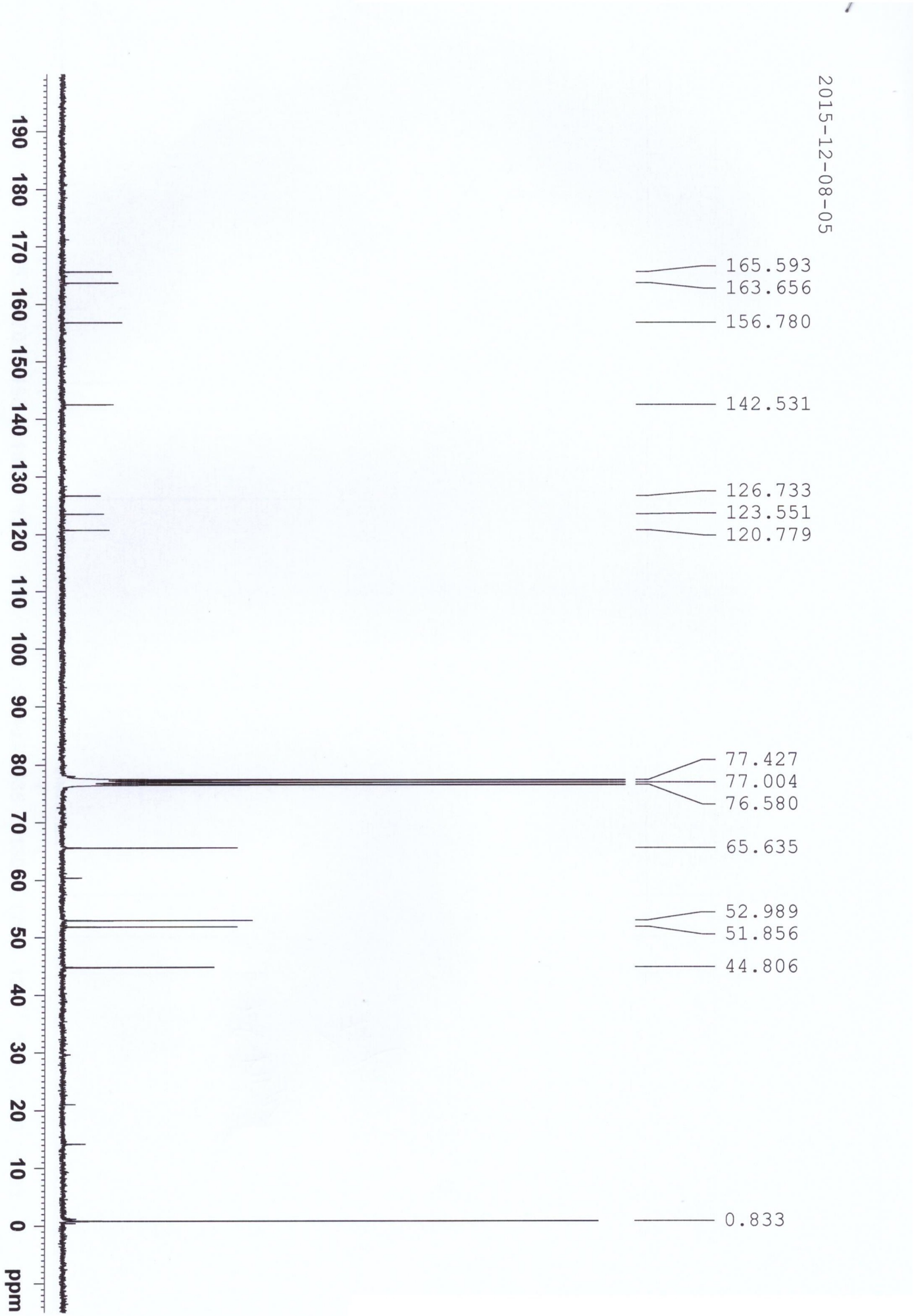
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142.531
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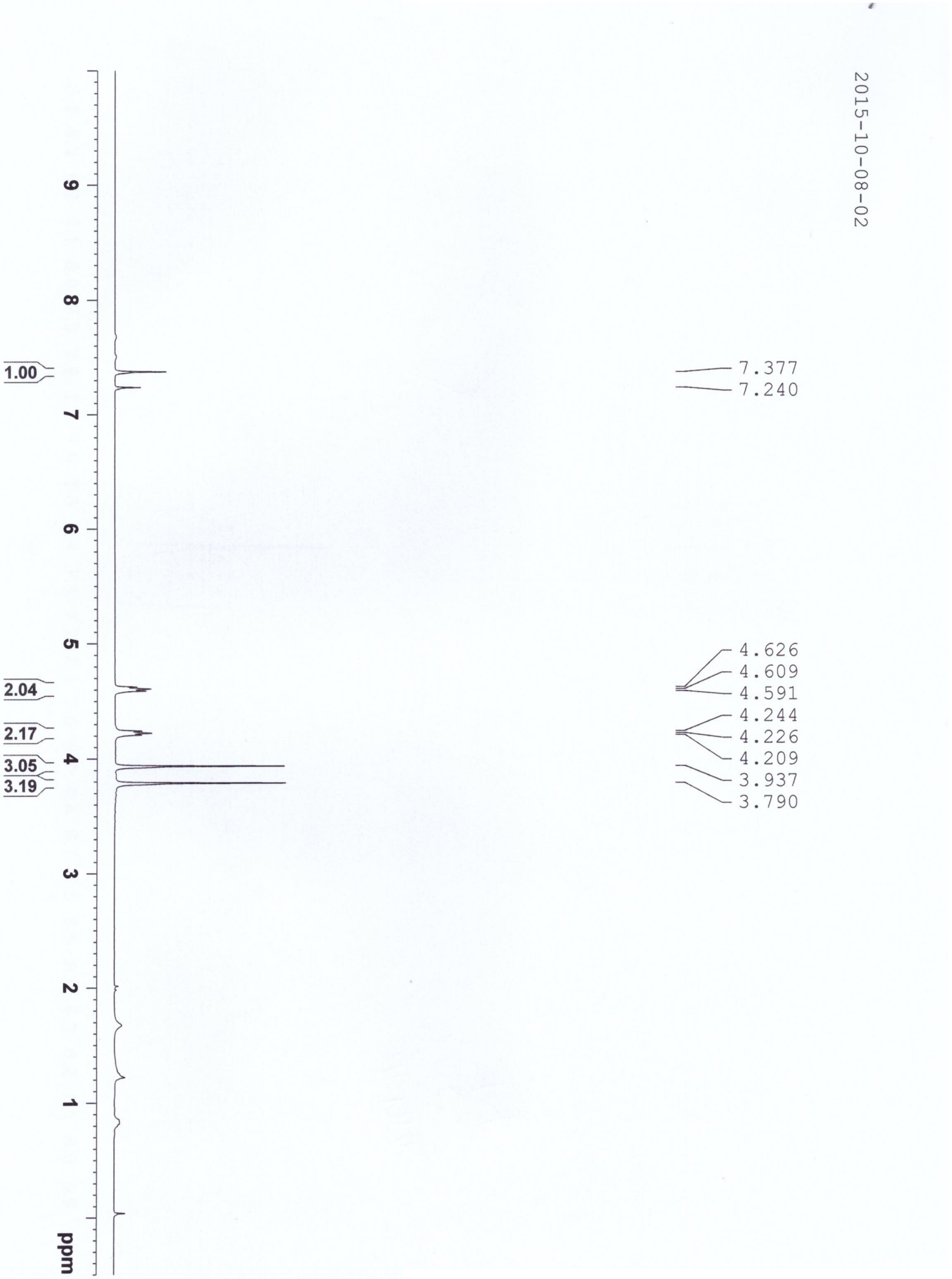
ppm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3.937
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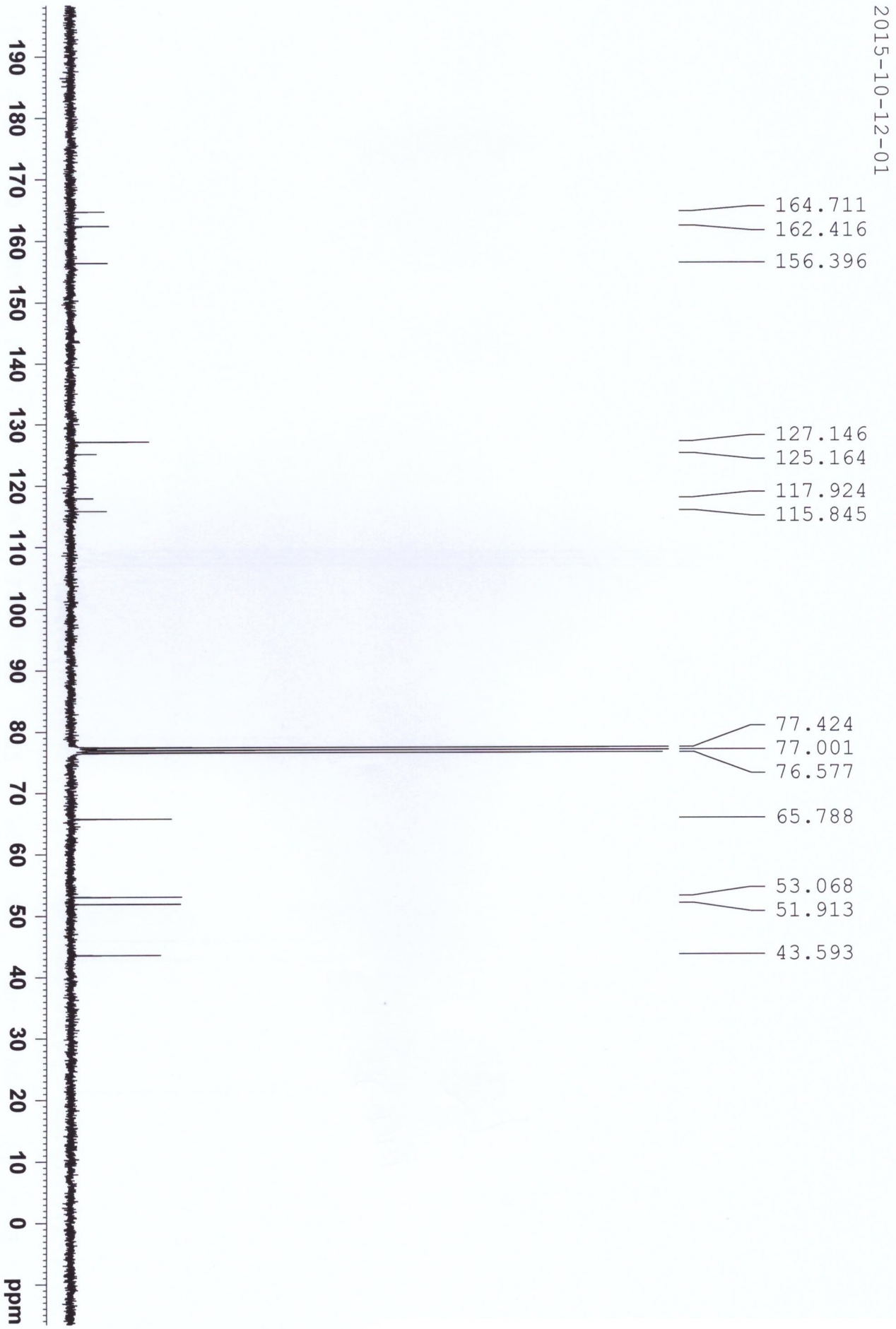
2.17
3.05
3.19
9
8
7
6
5
4
3
2
1
ppm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53.068
51.913
43.593
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm