

Iridium-Catalyzed Hydrogen Transfer – Synthesis of Substituted Benzofurans, Benzothiophenes and Indoles from Benzyl Alcohols

Bruno Anxionnat, Domingo Gomez Pardo, Gino Ricci, Kai Rossen and Janine Cossy*

Laboratoire de Chimie Organique, ESPCI ParisTech, CNRS, 10 rue Vauquelin, 75231 Paris Cedex 05, France

Sanofi, Process Development, 45 chemin de Mételine, BP 15, 04201 Sisteron Cedex, France

*Sanofi-Aventis Deutschland GmbH, Chemistry & Biotechnology Development (C&BD) Frankfurt Chemistry
Industriepark Höchst, Building G 838, 65926 Frankfurt am Main, Germany.*

janine.cossy@espci.fr

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General experimental methods

All reactions were run under an atmosphere of argon. Sealed tubes were dried in an oven overnight and cooled under a stream of argon. Commercially available anhydrous 1,4-dioxane (>99.9%), cesium carbonate were purchased from Aldrich and $[\text{IrCp}^*\text{Cl}_2]_2$ from TCI and were used directly without further purification. ^1H NMR spectra were recorded on a Bruker AVANCE 400 at 400 MHz and data are reported as follows: chemical shift in ppm from tetramethylsilane as internal standard, multiplicity (s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet or overlap of non-equivalent resonances, integration). ^{13}C NMR spectra were recorded on a Bruker AVANCE 400 at 100 MHz and data are reported as follows: chemical shift in ppm from tetramethylsilane with the solvent as internal standard (CDCl_3 , δ 77.0 ppm or DMSO-d_6 , δ 40.4 ppm), multiplicity with respect to proton (deduced from DEPT experiments, s = quaternary C, d = CH, t = CH_2 , q = CH_3). Mass spectra with electronic impact (MS-EI) were recorded from a Hewlett-Packard tandem 5890A GC (12 m capillary column) -5971 MS (70 eV). Infrared (IR) spectra were recorded on a Bruker TENSORTM 27 (IRFT), wave-numbers are indicated in cm^{-1} . TLC was performed on Merck 60F₂₅₄ silica gel plates and visualized with a UV lamp (254 nm), or by using solutions of $\text{KMnO}_4/\text{K}_2\text{CO}_3/\text{NaOH}$ in water followed by heating. Column chromatography was performed with Merck Geduran Si 60 silica gel (40–63 μm). High resolution mass spectra (HRMS) were performed by the centre regional de microanalyse (Université Pierre et Marie Curie Paris VI).

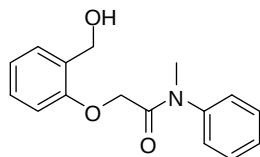
Preparation of the starting materials

Compounds **1**,¹ **5**² and **19a**³ were already described in the literature.

General procedure 1: To a solution of phenol, thiophenol or aniline (1 equiv) in acetone (0.1 M) were successively added the corresponding alkyl bromide (1.5 equiv) and K_2CO_3 (1.5 equiv). After 12 h under reflux, the reaction medium was cooled, filtered and concentrated under reduced pressure. The residue was purified by flash chromatography on silica gel using PE/EtOAc.

General procedure 2: To a solution of salicylaldehyde (1 equiv) in Et_2O (1 M) was slowly added at 0 °C the desired alkyl or aryl magnesium bromide (4 equiv.). After 2 h under reflux, the reaction medium was cooled at 0 °C then hydrolyzed with an aqueous saturated solution of NH_4Cl . The layers were separated and the aqueous layer was extracted with Et_2O . The organic layers were combined, dried over MgSO_4 , filtered and concentrated under reduced pressure. The residue was purified by flash chromatography on silica gel using PE/EtOAc. To a solution of this phenol (1 equiv) in acetone (0.1 M) were successively added the corresponding alkyl bromide (1.5 equiv) and K_2CO_3 (1.5 equiv). After 12 h under reflux, the reaction medium was cooled, filtered and concentrated under reduced pressure. The residue was purified by flash chromatography on silica gel using PE/EtOAc.

2-[2-(Hydroxymethyl)phenoxy]-N-methyl-N-phenylacetamide **6**



General procedure 1: After flash chromatography (PE/EtOAc 5/5), **6** (542 mg, 2.00 mmol) was obtained by alkylation of 2-(hydroxymethyl)phenol (248 mg, 2.00 mmol) by

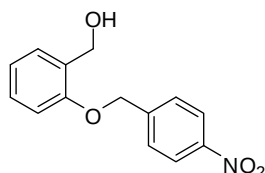
¹ Huang, F.-C.; Galemme, R. A.; Johnson, W. H.; Poli, G. B.; Morrisette, M. M.; Mencil, J. J.; Warus, J. D.; Campbell, H. F.; Nuss, G. W. *J. Med. Chem.* **1990**, 33, 1194–1200.

² Masood, M. A.; Gardner, M.; Dack, K.; Winpenny, D.; Lunn, G. *Bioorg. Med. Chem. Lett.* **2012**, 22, 3682–3687.

³ Hsiao, C.-N.; Bhagavatula, L.; Pariza, R. J. *Synth. Commun.* **1990**, 20, 1687–1695.

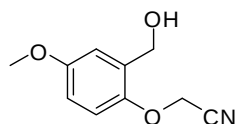
2-bromo-*N*-methyl-*N*-phenylacétamide and **6** was isolated as a colorless oil (100%). **IR ν (neat)**: 3396, 3061, 2930, 1655, 1593, 1492, 1396, 1340, 1288, 1222, 1116, 1073, 1030 cm^{-1} . **^1H NMR (400 MHz, CDCl_3) δ** : 7.54–7.41 (m, 3H), 7.28–7.22 (m, 3H), 7.18 (ddd, J = 8.0, 8.0 and 1.7 Hz, 1H), 6.99 (ddd, J = 7.3, 7.3 and 1.0 Hz, 1H), 6.62 (d, J = 8.0 Hz, 1H), 4.66 (s, 2H), 4.50 (s, 2H), 3.30 (s, 3H), 3.17 (s br, 1H) ppm. **^{13}C NMR (100 MHz, CDCl_3) δ** : 168.3 (s), 156.8 (s), 141.7 (s), 131.1 (s), 130.3 (d, 2C), 129.9 (d), 128.9 (d), 128.8 (d), 127.0 (d, 2C), 121.9 (d), 112.4 (d), 66.4 (t), 62.2 (t), 37.6 (q) ppm. **MS (IE) m/z (%)**: 271 (M^+ , 1), 149 (46), 148 (45), 134 (18), 120 (26), 107 (53), 106 (35), 93 (11), 92 (100), 91 (18), 79 (18), 78 (11), 77 (59), 58 (11). **HRMS** : Calcd. for $\text{C}_{16}\text{H}_{17}\text{NO}_3\text{Na}$: (MNa) $^+$, 294.1100. Found: 294.1093.

{2-[(4-Nitrophenyl)methoxy]phenyl}methanol **7**



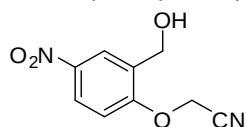
General procedure 1: After flash chromatography (PE/EtOAc 8/2), **7** (477 mg, 1.84 mmol) was obtained by alkylation of 2-(hydroxymethyl)phenol (248 mg, 2.00 mmol) by *p*-nitrobenzyle bromide and **7** was isolated as a white solid. **Tf**: 102 °C. **IR ν (neat)**: 3246, 3080, 2908, 2858, 1599, 1512, 1492, 1444, 1341, 1240, 1048 cm^{-1} . **^1H NMR (400 MHz, CDCl_3) δ** : 8.28 (d, J = 8.6 Hz, 2H), 7.63 (d, J = 8.6 Hz, 2H), 7.39 (d, J = 7.3 Hz, 1H), 7.29 (ddd, J = 7.8, 7.8 and 1.5 Hz, 1H), 7.03 (dd, J = 7.5 and 7.5 Hz, 1H), 6.90 (d, J = 8.2 Hz, 1H), 5.26 (s, 2H), 4.81 (s, 2H), 1.80 (s br, 1H) ppm. **^{13}C NMR (100 MHz, CDCl_3) δ** : 155.8 (s), 147.7 (s), 144.2 (s), 129.5 (s), 129.1 (d), 129.0 (d), 127.5 (d, 2C), 124.0 (d, 2C), 121.6 (d), 111.5 (d), 68.7 (t), 61.7 (t) ppm. **MS (IE) m/z (%)**: 259 (M^+ , 5), 136 (14), 107 (16), 106 (100), 90 (19), 89 (17), 78 (48), 77 (18). **HRMS** : Calcd. for $\text{C}_{14}\text{H}_{13}\text{NO}_4\text{Na}$: (MNa) $^+$, 282.0737. Found: 282.0737.

2-[2-(Hydroxymethyl)-4-méthoxyphénoxy]acetonitrile **11a**



General procedure 1: After flash chromatography (PE/EtOAc 7/3), **11a** (374 mg, 1.94 mmol) was obtained by alkylation of 2-(hydroxymethyl)-4-methoxyphenol (208 mg, 2.00 mmol) by bromoacetonitrile and **11a** was isolated as a cream solid (97%). **Tf**: 104 °C. **IR ν (neat)**: 3499, 2940, 2269, 1493, 1454, 1429, 1371, 1269, 1204, 1149, 1042, 1024 cm^{-1} . **NMR ^1H (400 MHz, CDCl_3) δ** : 6.97 (d, J = 3.1 Hz, 1H), 6.90 (d, J = 8.8 Hz, 1H), 6.79 (dd, J = 8.9 and 3.1 Hz, 1H), 4.74 (s, 2H), 4.66 (s, 2H), 3.77 (s, 3H), 2.30 (s br, 1H) ppm. **NMR ^{13}C (100 MHz, CDCl_3) δ** : 155.7 (s), 148.2 (s), 132.0 (s), 115.5 (s), 115.0 (d), 114.3 (d), 113.3 (d), 60.6 (t), 55.8 (q), 55.1 (t) ppm. **MS (IE) m/z (%)**: 193 (M^+ , 30), 153 (15), 125 (100), 110 (33), 107 (15), 93 (30), 77 (15), 65 (29), 55 (12), 53 (12). **HRMS** : Calcd. for $\text{C}_{10}\text{H}_{11}\text{NO}_3\text{Na}$: (MNa) $^+$, 216.0631. Found: 216.0633.

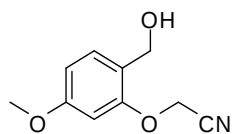
2-[2-(Hydroxymethyl)-4-nitrophenoxy]acetonitrile **11b**



General procedure 1: After flash chromatography (PE/EtOAc 7/3), **11b** (228 mg, 1.10 mmol) was obtained by alkylation of 2-(hydroxymethyl)-4-nitrophenol (338 mg, 2.00 mmol) by bromoacetonitrile and **11b** was isolated as a cream solid (55%). **Tf**: 86 °C. **IR ν (neat)**: 3526, 3082, 3054, 2227, 1615, 1592, 1495, 1343, 1250, 1096, 1037, 1012 cm^{-1} . **^1H NMR (400 MHz, CDCl_3) δ** : 8.42 (ddd, J = 2.8, 0.8 and 0.8 Hz, 1H), 8.26 (dd, J = 9.0 and 2.8 Hz, 1H), 7.03 (d, J = 9.2 Hz, 1H), 4.93 (s, 2H), 4.80 (s, 2H) ppm. **^{13}C NMR (100 MHz, CDCl_3) δ** : 157.8 (s), 143.3 (s), 131.7 (s), 124.8 (d), 124.1 (d), 113.8 (s), 110.8

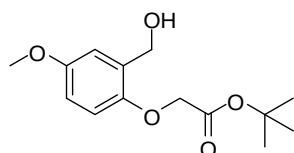
(d), 59.5 (t), 53.7 (t) ppm. **MS (IE) m/z (%)**: 208 (M^+ , 26), 168 (100), 151 (45), 94 (50), 92 (40), 77 (60), 66 (60), 65 (86), 63 (53), 51 (62). **HRMS** : *Calcd. for $C_8H_8N_2O_4Na$: (MNa) $^+$* , 231.0382. Found: 231.0388.

2-[2-(Hydroxymethyl)-5-methoxyphenoxy]acetonitrile **11c**



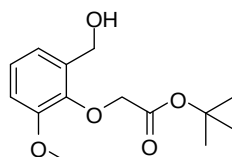
General procedure 1: After flash chromatography (PE/EtOAc 7/3), **11c** (386 mg, 2.00 mmol) was obtained by alkylation of 2-(hydroxymethyl)-5-methoxyphenol (208 mg, 2.00 mmol) by bromoacetonitrile and **11c** was isolated as a colorless oil (100%). **IR ν (neat)**: 3379, 2937, 2839, 1613, 1588, 1507, 1443, 1290, 1255, 1195, 1159, 1124, 1037 cm^{-1} . **1H NMR (400 MHz, $CDCl_3$) δ** : 7.28 (d, J = 8.3 Hz, 1H), 6.60 (dd, J = 8.3 and 2.2 Hz, 1H), 6.53 (d, J = 2.2 Hz, 1H), 4.81 (s, 2H), 4.63 (s, 2H), 3.82 (s, 3H), 1.89 (s br, 1H) ppm. **^{13}C NMR (100 MHz, $CDCl_3$) δ** : 160.6 (s), 155.3 (s), 130.7 (d), 122.5 (s), 114.9 (s), 106.8 (d), 100.2 (d), 60.5 (t), 55.6 (q), 53.9 (t) ppm. **MS (IE) m/z (%)**: 193 (M^+ , 100), 176 (44), 165 (54), 151 (33), 137 (51), 125 (46), 107 (20), 93 (24), 77 (28), 65 (50), 51 (23). **HRMS**: *Calcd. for $C_{10}H_{11}NO_3Na$: (MNa) $^+$* , 216.0631. Found: 216.0627.

tert-Butyle 2-[2-(hydroxymethyl)-4-methoxyphenoxy]acetate **12a**



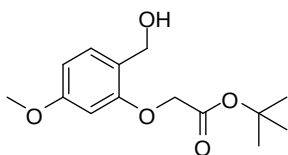
General procedure 1: After flash chromatography (PE/EtOAc 7/3), **12a** (487 mg, 1.82 mmol) was obtained by alkylation of 2-(hydroxymethyl)-4-methoxyphenol (208 mg, 2.00 mmol) by *tert*-butyle bromoacetate and **12a** was isolated as a colorless oil (91%). **IR ν (neat)**: 3412, 3020, 2901, 1650, 1564, 1432, 1398, 1320, 1232, 1165, 1076, 1011 cm^{-1} . **1H NMR (400 MHz, $CDCl_3$) δ** : 6.86 (d, J = 2.6 Hz, 1H), 6.78–6.71 (m, 2H), 4.68 (s, 2H), 4.55 (s, 2H), 3.77 (s, 3H), 1.47 (s, 9H) ppm. **^{13}C NMR (100 MHz, $CDCl_3$) δ** : 168.8 (s), 154.4 (s), 150.4 (s), 131.5 (s), 115.3 (d), 113.3 (d), 113.2 (d), 82.9 (s), 66.7 (t), 62.2 (t), 55.7 (q), 28.0 (q, 3C) ppm. **MS (IE) m/z (%)**: 268 (M^+ , 20), 212 (48), 152 (32), 137 (93), 136 (70), 135 (33), 125 (83), 77 (27), 65 (22), 57 (100), 56 (64). **HRMS** : *Calcd. for $C_{14}H_{20}O_6Na$: (MNa) $^+$* , 291.1203. Found: 291.1198.

tert-Butyle 2-[2-(Hydroxymethyl)-6-methoxyphenoxy]acetate **12b**



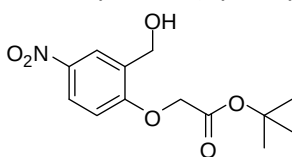
General procedure 1: After flash chromatography (PE/EtOAc 7/3), **12b** (531 mg, 1.96 mmol) was obtained by alkylation of 2-(hydroxymethyl)-6-methoxyphenol (208 mg, 2.00 mmol) by *tert*-butyle bromoacetate and **12b** was isolated as a colorless oil (98%). **IR ν (neat)**: 3435, 2977, 1731, 1587, 1478, 1368, 1253, 1206, 1151, 1083, 1058, 1024 cm^{-1} . **1H NMR (400 MHz, $CDCl_3$) δ** : 7.00 (dd, J = 7.8 and 7.8 Hz, 1H), 6.88 (dd, J = 7.8 and 1.5 Hz, 1H), 6.86 (dd, J = 8.1 and 1.6 Hz, 1H), 4.69 (s, 2H), 4.67 (s, 2H), 3.84 (s, 3H), 1.47 (s, 9H) ppm. **^{13}C NMR (100 MHz, $CDCl_3$) δ** : 170.5 (s), 151.2 (s), 146.1 (s), 134.5 (s), 123.9 (d), 121.9 (d), 112.4 (d), 82.7 (s), 69.8 (t), 61.7 (t), 55.8 (q), 28.1 (q, 3C) ppm. **MS (IE) m/z (%)**: 268 (M^+ , 3), 165 (12), 153 (15), 152 (13), 136 (100), 135 (14), 107 (11), 106 (10), 93 (20), 77 (12), 65 (13), 57 (80). **HRMS** : *Calcd. for $C_{14}H_{20}O_5Na$: (MNa) $^+$* , 291.1203. Found: 291.1206.

tert-Butyle 2-[2-(hydroxymethyl)-5-methoxyphenoxy]acetate **12c**



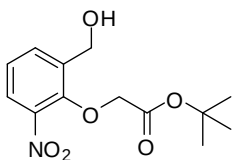
General procedure 1: After flash chromatography (PE/EtOAc 7/3), **12c** (536 mg, 2.00 mmol) was obtained by alkylation of 2-(hydroxymethyl)-5-methoxyphenol (208 mg, 2.00 mmol) by *tert*-butyle bromoacetate and **12c** was isolated as a colorless oil (100%). **IR ν (neat):** 3434, 2978, 1734, 1613, 1506, 1369, 1249, 1150, 1127, 1039 cm^{-1} . **^1H NMR (400 MHz, CDCl_3) δ :** 7.16 (d, J = 8.2 Hz, 1H), 6.46 (dd, J = 8.2 and 2.3 Hz, 1H), 6.35 (d, J = 2.3 Hz, 1H), 4.62 (s, 2H), 4.54 (s, 2H), 3.76 (s, 3H), 3.41 (s br, 1H), 1.46 (s, 9H) ppm. **^{13}C NMR (100 MHz, CDCl_3) δ :** 168.3 (s), 160.5 (s), 157.2 (s), 130.3 (d), 122.9 (s), 105.3 (d), 99.9 (d), 82.9 (s), 65.9 (t), 61.6 (t), 55.4 (q), 28.0 (q, 3C) ppm. **MS (IE) m/z (%):** 268 (M^+ , 16), 211 (70), 195 (31), 165 (63), 153 (65), 137 (73), 121 (17), 107 (12), 91 (12), 77 (25), 57 (100). **HRMS:** Calcd. for $\text{C}_{14}\text{H}_{20}\text{O}_5\text{Na}$: (MNa) $^+$, 291.1203. Found: 291.1216.

tert-Butyle 2-[2-(hydroxymethyl)-4-nitrophenoxy]acetate **12d**



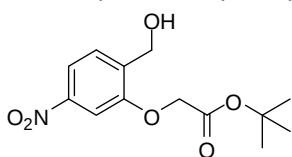
General procedure 1: After flash chromatography (PE/EtOAc 7/3), **12d** (373 mg, 1.32 mmol) was obtained by alkylation of 2-(hydroxymethyl)-4-nitrophenol (338 mg, 2.00 mmol) by *tert*-butyle bromoacetate and **12d** was isolated as a cream solid (66%). **Tf:** 93 $^{\circ}\text{C}$. **IR ν (neat):** 3527, 2991, 1748, 1735, 1591, 1493, 1337, 1283, 1243, 1151, 1067 cm^{-1} . **^1H NMR (400 MHz, CDCl_3) δ :** 8.27 (d, J = 3.1 Hz, 1H), 8.19 (dd, J = 9.0 and 2.8 Hz, 1H), 6.84 (d, J = 9.0 Hz, 1H), 4.79 (s, 2H), 4.69 (s, 2H), 1.49 (s, 9H) ppm. **^{13}C NMR (100 MHz, CDCl_3) δ :** 167.0 (s), 160.5 (s), 142.1 (s), 131.4 (s), 125.0 (d), 124.6 (d), 111.1 (d), 83.7 (s), 66.0 (t), 60.9 (t), 28.0 (q, 3C) ppm. **MS (IE) m/z (%):** 226 ($\text{M}^+ - t\text{-Bu}$, 6), 210 (10), 59 (14), 57 (100). **HRMS:** Calcd. for $\text{C}_{13}\text{H}_{17}\text{O}_6\text{NNa}$: (MNa) $^+$, 306.0948. Found: 306.0945.

tert-Butyle 2-[2-(hydroxymethyl)-6-nitrophenoxy]acetate **12e**



General procedure 1: After flash chromatography (PE/EtOAc 7/3), **12e** (317 mg, 1.12 mmol) was obtained by alkylation of 2-(hydroxymethyl)-6-nitrophenol (338 mg, 2.00 mmol) by *tert*-butyle bromoacetate and **12e** was isolated as a yellow oil (56%). **IR ν (neat):** 3435, 2980, 1732, 1528, 1350, 1219, 1151, 1049 cm^{-1} . **^1H NMR (400 MHz, CDCl_3) δ :** 7.83 (dd, J = 8.3 and 1.7 Hz, 1H), 7.61 (dd, J = 7.5 and 1.7 Hz, 1H), 7.20 (dd, J = 7.6 and 7.6 Hz, 1H), 4.78 (s, 2H), 4.52 (s, 2H), 1.50 (s, 9H) ppm. **^{13}C NMR (100 MHz, CDCl_3) δ :** 168.8 (s), 151.1 (s), 142.1 (s), 137.2 (s), 135.0 (d), 125.4 (d), 124.1 (d), 83.7 (s), 71.1 (t), 60.9 (t), 28.0 (q, 3C) ppm. **MS (IE) m/z (%):** 226 ($\text{M}^+ - t\text{-Bu}$, 1), 107 (12), 59 (20), 57 (100), 52 (13), 51 (12). **HRMS:** Calcd. for $\text{C}_{13}\text{H}_{17}\text{NO}_6\text{Na}$: (MNa) $^+$, 306.0948. Found: 306.0949.

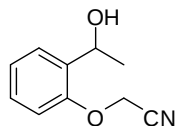
tert-Butyle 2-[2-(hydroxymethyl)-5-nitrophenoxy]acetate **12f**



General procedure 1: After flash chromatography (PE/EtOAc 7/3), **12f** (294 mg, 1.04 mmol) was obtained by alkylation of 2-(hydroxymethyl)-5-nitrophenol (338 mg, 2.00 mmol) by *tert*-butyle bromoacetate and **12f** was isolated as a yellow oil (54%). **IR ν (neat):** 3320, 2987, 2876, 1671, 1532,

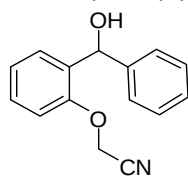
1498, 1432, 1368, 1299, 1159, 1045 cm^{-1} . ^1H NMR (400 MHz, CDCl_3) δ : 7.89 (dd, J = 8.2 and 2.1 Hz, 1H), 7.63 (d, J = 2.0 Hz, 1H), 7.52 (d, J = 8.3 Hz, 1H), 4.80 (s, 2H), 4.69 (s, 2H), 3.27 (s br, 1H), 1.50 (s, 9H) ppm. ^{13}C NMR (100 MHz, CDCl_3) δ : 167.4 (s), 155.9 (s), 148.1 (s), 137.6 (s), 129.0 (d), 117.1 (d), 106.6 (d), 83.6 (s), 66.0 (t), 60.9 (t), 28.0 (q, 3C) ppm. MS (IE) m/z (%): 226 ($\text{M}^+ - t\text{-Bu}^+$, 9), 59 (15), 57 (100). HRMS: Calcd. for $\text{C}_{13}\text{H}_{17}\text{NO}_6\text{Na}$: (MNa) $^+$, 306.0948. Found : 306.0952.

2-[2-(1-Hydroxyéthyl)phénoxy]acétonitrile **15a**



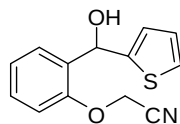
General procedure 2: After flash chromatography (PE/EtOAc 8/2), **15a** (329 mg, 1.86 mmol) was obtained after alkylation of salicaldehyde by MeMgBr followed by the alkylation of the phenol by bromoacetonitrile and **15a** was isolated as a colorless oil (93% two steps). IR ν (neat): 3374, 2974, 2928, 2258, 1587, 1488, 1450, 1366, 1287, 1214, 1078, 1038 cm^{-1} . ^1H NMR (400 MHz, CDCl_3) δ : 7.51 (dd, J = 7.6 and 1.7 Hz, 1H), 7.29 (ddd, J = 9.3, 7.6 and 1.8 Hz, 1H), 7.12 (ddd, J = 7.5, 7.5 and 0.9 Hz, 1H), 6.93 (dd, J = 8.2 and 1.0 Hz, 1H), 5.19 (q, J = 6.5 Hz, 1H), 4.82 (s, 2H), 2.18 (s br, 1H), 1.48 (d, J = 6.4 Hz, 3H) ppm. ^{13}C NMR (100 MHz, CDCl_3) δ : 153.1 (s), 135.0 (s), 128.5 (d), 126.7 (d), 123.4 (d), 115.1 (s), 111.7 (d), 65.0 (d), 53.7 (t), 23.6 (q) ppm. MS (IE) m/z (%): 177 (M^+ , 5), 162 (21), 135 (100), 121 (22), 107 (13), 91 (20), 77 (32), 65 (32), 63 (15), 51 (22). HRMS: Calcd. for $\text{C}_{10}\text{H}_{11}\text{NO}_2\text{Na}$: (MNa) $^+$, 200.0682. Found: 200.0681.

2-[2-[Hydroxy(phenyl)méthyl]phénoxy]acétonitrile **15b**



General procedure 2: After flash chromatography (PE/EtOAc 8/2), **15b** (478 mg, 2.00 mmol) was obtained after alkylation of salicaldehyde by PhMgBr followed by the alkylation of the phenol by bromoacetonitrile and **15b** was isolated as a colorless oil (100% two steps). IR ν (neat): 3404, 3063, 2187, 1588, 1489, 1456, 1294, 1219, 1118, 1038, 1013 cm^{-1} . ^1H NMR (400 MHz, CDCl_3) δ : 7.51 (dd, J = 7.6 and 1.7 Hz, 1H), 7.38–7.23 (m, 6H), 7.12 (ddd, J = 7.5, 7.5 and 1.0 Hz, 1H), 6.91 (dd, J = 8.3 and 1.0 Hz, 1H), 6.09 (s, 1H), 4.63 (s, 2H), 2.49 (s br, 1H) ppm. ^{13}C NMR (100 MHz, CDCl_3) δ : 153.6 (s), 143.0 (s), 133.3 (s), 128.9 (d), 128.5 (d, 2C), 128.0 (d), 127.6 (d), 126.6 (d, 2C), 123.4 (d), 115.0 (s), 112.3 (d), 71.0 (d), 53.9 (t) ppm. MS (IE) m/z (%): 239 (M^+ , 4), 199 (37), 198 (24), 197 (32), 152 (16), 135 (33), 121 (75), 107 (18), 105 (74), 91 (19), 79 (37), 78 (22), 77 (100), 76 (19), 65 (27), 51 (40). HRMS : Calcd. for $\text{C}_{15}\text{H}_{13}\text{NO}_2\text{Na}$: (MNa) $^+$, 262.0838. Found: 262.0842.

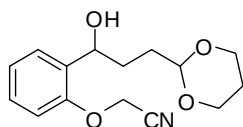
2-[2-[Hydroxy(thiophen-2-yl)méthyl]phénoxy]acétonitrile **15c**



General procedure 2: After flash chromatography (PE/EtOAc 8/2), **15c** (397 mg, 1.62 mmol) was obtained after alkylation of salicaldehyde by 2-ThienylMgBr followed by the alkylation of the phenol by bromoacetonitrile and **15c** was isolated as a yellow oil (81% two steps). IR ν (neat): 3417, 2922, 2285, 1487, 1455, 1291, 1216, 1111, 1038 cm^{-1} . ^1H NMR (400 MHz, CDCl_3) δ : 7.58 (dd, J = 7.5 and 1.7 Hz, 1H), 7.35 (ddd, J = 8.1, 7.6 and 1.8 Hz, 1H), 7.24 (dd, J = 3.0 and 1.2 Hz, 1H), 7.15 (ddd, J = 7.5, 7.5 and 1.0 Hz, 1H), 6.97 (dd, J = 8.2 and 1.0 Hz, 1H), 6.93 (dd, J = 5.0 and 3.5 Hz, 1H), 6.87 (ddd, J = 3.5, 1.0 and 1.0 Hz), 6.30 (d, J = 3.5 Hz, 1H), 4.71 (s, 2H), 2.71 (d, J = 4.9 Hz, 1H) ppm. ^{13}C NMR (100 MHz, CDCl_3) δ : 153.4 (s), 147.3 (s), 132.7 (s), 129.3 (d), 127.8 (d), 126.7 (d), 125.2 (d), 124.7 (d), 123.5 (d), 114.9 (s), 112.3 (d), 67.5 (d), 53.8 (t) ppm. MS (IE) m/z (%): 245 (M^+ , 15), 204 (17), 186 (18), 161

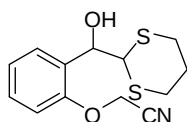
(19), 160 (71), 121 (100), 120 (49), 115 (28), 113 (20), 111 (36), 85 (68), 84 (38), 77 (19), 65 (21). **HRMS**: Calcd. for $C_{13}H_{11}O_2NSNa$: $(MNa)^+$, 268.0403. Found: 268.0407.

2-{2-[3-(1,3-Dioxan-2-yl)-1-hydroxypropyl]phenoxy}acetonitrile **15d**



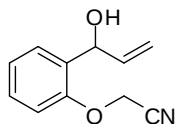
General procedure 2: After flash chromatography (PE/EtOAc 7/3), **15d** (544 mg, 2.00 mmol) was obtained after alkylation of salicaldehyde by 2-Ethyl-1,3-dioxanylmgBr followed by the alkylation of the phenol by bromoacetonitrile and **15d** was isolated as a colorless oil (100% two steps). **IR ν (neat)**: 3426, 2961, 2856, 2274, 1488, 1453, 1378, 1286, 1215, 1136, 1084, 1039 cm^{-1} . **1H NMR (400 MHz, $CDCl_3$) δ** : 7.42 (dd, J = 7.6 and 1.5 Hz, 1H), 7.18 (ddd, J = 8.0, 8.0 and 2.5 Hz, 1H), 7.01 (dd, J = 7.5 and 7.5 Hz, 1H), 6.81 (d, J = 8.0 Hz, 1H), 4.93 (m, 1H), 4.70 (s, 2H), 4.49 (dd, J = 4.9 and 4.9 Hz, 1H), 4.01 dd, J = 10.8 and 5.0 Hz, 2H), 3.68 (ddm, J = 12.4 and 12.4 Hz, 2H), 3.04 (s br, 1H), 1.98 (m, 1H), 1.85–1.56 (m, 4H), 1.26 (dm, J = 13.3 Hz, 1H) ppm. **^{13}C NMR (100 MHz, $CDCl_3$) δ** : 153.1 (s), 134.0 (s), 128.3 (d), 127.4 (d), 123.2 (d), 115.3 (s), 111.6 (d), 102.0 (d), 68.2 (d), 66.9 (t, 2C), 53.7 (t), 31.9 (t), 31.4 (t), 25.7 (t) ppm. **MS (IE) m/z (%)**: 277 (M^+ , 1), 201 (16), 173 (11), 148 (14), 144 (11), 135 (50), 121 (14), 116 (16), 105 (16), 100 (41), 87 (100), 77 (18), 59 (47), 58 (88), 57 (20). **HRMS**: Calcd. for $C_{15}H_{19}NO_4Na$: $(MNa)^+$, 300.1206. Found: 300.1200.

2-{2-[1,3-Dithian-2-yl(hydroxy)methyl]phenoxy}acetonitrile **15e**



General procedure 2: After flash chromatography (PE/EtOAc 7/3), **15e** (169 mg, 0.60 mmol) was obtained after alkylation of salicaldehyde by dithianeli followed by the alkylation of the phenol by bromoacetonitrile and **15e** was isolated as a colorless oil (60% two steps). **IR ν (neat)**: 3533, 2911, 1602, 1488, 1454, 1215, 1073, 1028 cm^{-1} . **1H NMR (400 MHz, $CDCl_3$) δ** : 7.52 (dd, J = 7.8 and 1.2 Hz, 1H), 7.33 (ddd, J = 8.6, 8.3 and 1.7 Hz, 1H), 7.12 (ddd, J = 7.5, 7.5 and 0.9 Hz, 1H), 6.93 (dd, J = 8.3 and 0.9 Hz, 1H), 5.32 (d, J = 7.5 Hz, 1H), 4.81 (s, 2H), 4.10 (d, J = 7.3 Hz, 1H), 3.11 (s br, 1H), 3.02–2.94 (m, 2H), 2.78–2.65 (m, 2H), 2.11–1.92 (m, 2H) ppm. **^{13}C NMR (100 MHz, $CDCl_3$) δ** : 154.1 (s), 129.9 (s), 129.4 (d), 128.3 (d), 123.2 (d), 115.2 (s), 111.8 (d), 68.8 (d), 53.9 (t), 51.7 (d), 28.3 (t), 27.4 (t), 25.4 (t) ppm. **MS (IE) m/z (%)**: 281 (M^+ , 1), 135 (8), 121 (14), 120 (15), 119 (100), 77 (7). **HRMS**: Calcd. for $C_{13}H_{15}NO_2S_2Na$: $(MNa)^+$, 304.0442. Found: 304.0449.

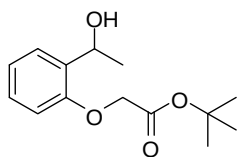
2-[2-(1-Hydroxyprop-2-en-1-yl)phenoxy]acetonitrile **15f**



General procedure 2: After flash chromatography (PE/EtOAc 9/1), **15f** (306 mg, 1.62 mmol) was obtained after alkylation of salicaldehyde by vinylmgBr followed by the alkylation of the phenol by bromoacetonitrile and **15f** was isolated as a colorless oil (81% two steps). **IR ν (neat)**: 3404, 2982, 2263, 1588, 1487, 1454, 1214, 1095, 1039 cm^{-1} . **1H NMR (400 MHz, $CDCl_3$) δ** : 7.45 (dd, J = 7.6 and 1.6 Hz, 1H), 7.30 (ddd, J = 7.7, 7.7 and 1.8 Hz, 1H), 7.11 (ddd, J = 7.5, 7.5 and 1.0 Hz, 1H), 6.94 (dd, J = 8.2 and 0.9 Hz, 1H), 6.05 (ddd, J = 17.1, 10.3 and 5.1 Hz, 1H), 5.49 (d, J = 5.4 Hz, 1H), 5.32 (ddd, J = 17.2, 1.5 and 1.5 Hz, 1H), 5.18 (ddd, J = 10.4, 1.2 and 1.2 Hz, 1H), 4.78 (s, 2H), 2.48 (s br, 1H) ppm. **^{13}C NMR (100 MHz, $CDCl_3$) δ** : 153.6 (s), 139.2 (d), 132.1 (s), 129.0 (d), 127.9 (d), 123.5 (d), 115.1 (s), 115.0 (t), 112.2 (d), 69.7 (d), 53.9 (t) ppm. **MS (IE) m/z (%)**: 189 (M^+ , 3), 160 (52), 149 (23), 147 (27), 135 (79), 133 (51), 131 (43), 121 (99), 107 (39), 105 (31), 104 (20), 103 (53), 93 (35), 92 (23), 91 (43),

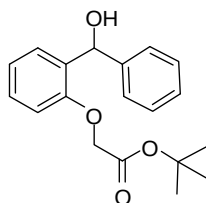
78 (21), 77 (100), 65 (50), 24 (63), 66 (55), 51 (40). **HRMS** : Calcd. for $C_{11}H_{11}NO_2Na$: (MNa)⁺, 212.0682. Found: 212.0680.

tert-Butyle 2-[2-(1-hydroxyethyl)phenoxy]acetate **16a**



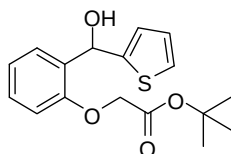
General procedure 2: After flash chromatography (PE/EtOAc 9/1), **16a** (418 mg, 1.66 mmol) was obtained after alkylation of salicaldehyde by MeMgBr followed by the alkylation of the phenol by *tert*-butyle bromoacetate and **16a** was isolated as a colorless oil (83% two steps). **IR ν (neat)**: 3435, 2977, 2931, 1736, 1588, 1489, 1452, 1368, 1214, 1152, 1084, 1009 cm^{-1} . **1H NMR (400 MHz, $CDCl_3$) δ** : 7.33 (dd, J = 7.5 and 1.6 Hz, 1H), 7.21 (ddd, J = 8.8, 7.7 and 1.7 Hz, 1H), 6.98 (ddd, J = 7.5, 7.5 and 1.0 Hz, 1H), 6.76 (dd, J = 8.3 and 1.0 Hz, 1H), 5.11 (q, J = 6.6 Hz, 1H), 4.61 (d, J = 15.6 Hz, 1H), 4.56 (d, J = 15.6 Hz, 1H), 3.18 (s br, 1H), 1.56 (d, J = 6.6 Hz, 3H), 1.48 (s, 9H) ppm. **^{13}C NMR (100 MHz, $CDCl_3$) δ** : 168.1 (s), 155.3 (s), 134.0 (s), 128.3 (d), 126.8 (d), 121.8 (d), 111.6 (d), 82.9 (s), 66.8 (d), 65.8 (t), 28.0 (q, 3C), 22.4 (q) ppm. **MS (IE) m/z (%)**: 252 (M^+ , 1), 195 (14), 181 (13), 149 (14), 135 (29), 121 (27), 119 (11), 91 (14), 77 (22), 57 (100). **HRMS** : Calcd. for $C_{14}H_{20}NO_4Na$: (MNa)⁺, 275.1259. Found: 275.1250.

tert-Butyle 2-[2-[hydroxy(phenyl)methyl]phenoxy]acetate **16b**



General procedure 2: After flash chromatography (PE/EtOAc 9/1), **16b** (509 mg, 1.62 mmol) was obtained after alkylation of salicaldehyde by PhMgBr followed by the alkylation of the phenol by *tert*-butyle bromoacetate and **16b** was isolated as a colorless oil (81% two steps). **IR ν (neat)**: 3447, 2978, 2931, 1734, 1488, 1454, 1368, 1217, 1151, 1117, 1069, 1020 cm^{-1} . **1H NMR (400 MHz, $CDCl_3$) δ** : 7.46–7.41 (m, 2H), 7.36–7.30 (m, 2H), 7.27–7.20 (m, 2H), 7.14 (dd, J = 7.6 and 1.7 Hz, 1H), 6.95 (ddd, J = 7.5, 7.5 and 1.0 Hz, 1H), 6.78 (dd, J = 8.2 and 0.9 Hz, 1H), 6.10 (s, 1H), 4.54 (s, 2H), 4.13 (s br, 1H), 1.48 (s, 9H) ppm. **^{13}C NMR (100 MHz, $CDCl_3$) δ** : 168.2 (s), 155.5 (s), 143.1 (s), 133.1 (s), 128.7 (d, 2C), 128.1 (d, 2C), 127.0 (d), 126.5 (d, 2C), 121.9 (d), 112.1 (d), 83.0 (s), 72.5 (d), 66.1 (t), 28.1 (q, 3C) ppm. **MS (IE) m/z (%)**: 257 ($M^+ - t-Bu$, 14), 121 (11), 105 (12), 91 (35), 77 (27), 57 (100). **HRMS** : Calcd. for $C_{19}H_{22}O_4Na$: (MNa)⁺, 337.1410. Found: 337.1400.

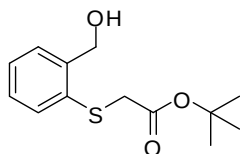
tert-Butyle 2-[2-[hydroxy(thiophen-2-yl)methyl]phenoxy]acetate **16c**



General procedure 2: After flash chromatography (PE/EtOAc 5/5), **16c** (633 mg, 1.98 mmol) was obtained after alkylation of salicaldehyde by 2-ThienylMgBr followed by the alkylation of the phenol by *tert*-butyle bromoacetate and **16c** was isolated as a yellow oil (99% two steps). **IR ν (neat)**: 3436, 2978, 2931, 1733, 1489, 1455, 1368, 1217, 1151, 1115, 1070, 1015 cm^{-1} . **1H NMR (400 MHz, $CDCl_3$) δ** : 7.29–7.24 (m, 2H), 7.23 (dd, J = 5.0 and 1.4 Hz, 1H), 6.99 (ddd, J = 7.5, 7.5 and 1.0 Hz, 1H), 6.93 (dd, J = 5.1 and 3.5 Hz, 1H), 6.86 (ddd, J = 3.5, 1.4 and 1.4 Hz, 1H), 6.81 (dd, J = 8.6 and 0.8 Hz, 1H), 6.23 (d, J = 5.9 Hz, 1H), 4.54 (s, 2H), 4.46 (d, J = 7.0 Hz, 1H), 1.48 (s, 9H) ppm. **^{13}C NMR (100 MHz, $CDCl_3$) δ** : 168.1 (s), 155.4 (s), 148.0 (s), 132.2 (s), 129.1 (d), 128.4 (d), 126.6 (d), 124.5 (d), 124.1 (d), 122.0 (d),

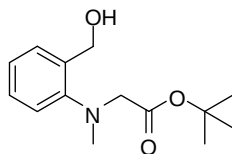
112.3 (d), 83.1 (s), 70.1 (d), 66.2 (t), 28.0 (q, 3C) ppm. **MS (IE) m/z (%)**: 320 (M^+ , 2), 263 (39), 262 (34), 246 (18), 178 (34), 151 (36), 135 (17), 121 (38), 111 (15), 97 (100), 77 (15), 57 (94). **HRMS**: Calcd. for $C_{17}H_{20}O_4SNa$: (MNa) $^+$, 343.0974. Found: 343.0967.

tert-Butyle 2-[[2-(hydroxymethyl)phenyl]sulfanyl]acetate **19b**



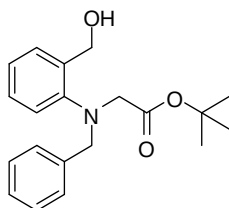
General procedure 1: After flash chromatography (PE/EtOAc 7/3), **19b** (432 mg, 1.70 mmol) was obtained by alkylation of 2-(hydroxymethyl)thiophenol (280 mg, 2.00 mmol) by *tert*-butyle bromoacetate and **19b** was isolated as a yellow oil (85%). **IR ν (neat)**: 3411, 2978, 2931, 1720, 1368, 1293, 1124, 1034 cm^{-1} . **1H NMR (400 MHz, $CDCl_3$) δ** : 7.48 (m, 1H), 7.43 (m, 1H), 7.32–7.25 (m, 2H), 4.82 (s, 2H), 3.60 (s, 2H), 2.95 (s br, 1H), 1.38 (s, 9H) ppm. **^{13}C NMR (100 MHz, $CDCl_3$) δ** : 169.1 (s), 142.0 (s), 133.4 (s), 132.0 (d), 129.1 (d), 128.5 (d), 127.9 (d), 82.4 (s), 63.7 (t), 38.4 (t), 27.8 (q, 3C) ppm. **MS (IE) m/z (%)**: 254 (M^+ , 2), 196 (10), 153 (12), 139 (30), 137 (15), 135 (13), 123 (12), 107 (29), 77 (20), 57 (100). **HRMS**: Calcd. for $C_{13}H_{18}O_3SNa$: (MNa) $^+$, 277.0869. Found: 277.0874.

tert-Butyle 2-[[2-(hydroxymethyl)phenyl](methyl)amino]acetate **20a**



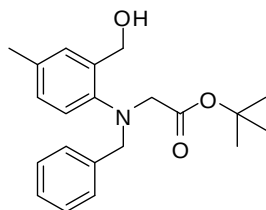
General procedure 1: After flash chromatography (PE/EtOAc 8/2), **20a** (281 mg, 1.12 mmol) was obtained by alkylation of (2-(methylamino)phenyl)methanol (274 mg, 2.00 mmol) by *tert*-butyle bromoacetate and **20a** was isolated as a colorless oil (56%). **IR ν (neat)**: 3240, 3012, 2941, 1711, 1543, 1498, 1423, 1343, 1311, 1256, 1230, 1054 cm^{-1} . **1H NMR (400 MHz, $CDCl_3$) δ** : 7.25 (ddd, J = 8.1, 8.1 and 1.7 Hz, 1H), 7.19 (dd, J = 7.4 and 1.5 Hz, 1H), 7.15 (dd, J = 8.0 and 1.1 Hz, 1H), 7.09 (ddd, J = 7.4, 7.4 and 1.3 Hz, 1H), 5.14 (s br, 1H), 4.75 (s, 2H), 3.67 (s, 2H), 2.76 (s, 3H), 1.44 (s, 9H) ppm. **^{13}C NMR (100 MHz, $CDCl_3$) δ** : 170.0 (s), 150.9 (s), 136.4 (s), 129.4 (d), 128.5 (d), 125.0 (d), 121.7 (d), 81.9 (s), 64.4 (t), 59.0 (t), 43.3 (q), 28.0 (q, 3C) ppm. **MS (IE) m/z (%)**: 251 (M^+ , 5), 151 (10), 150 (100), 132 (19), 120 (26), 118 (13), 109 (17), 107 (11), 106 (17), 91 (17), 77 (12), 57 (17), 56 (14). **HRMS**: Calcd. for $C_{14}H_{22}NO_3$: (MH) $^+$, 252.1594. Found: 252.1597.

tert-Butyle 2-[benzyl[2-(hydroxyméthyl)phényl]amino]acetate de *tert*-butyle **20b**



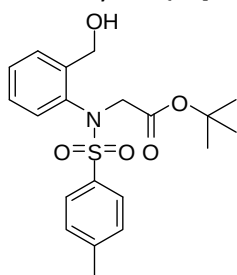
General procedure 1: After flash chromatography (PE/EtOAc 7/3), **20b** (366 mg, 1.12 mmol) was obtained by alkylation of (2-(benzylamino)phenyl)methanol (416 mg, 2.00 mmol) by *tert*-butyle bromoacetate and **20b** was isolated as a colorless oil (56%). **1H NMR (400 MHz, $CDCl_3$) δ** : 7.29–7.14 (m, 7H), 7.08 (dd, J = 8.7 and 1.1 Hz, 1H), 7.03 (ddd, J = 7.4, 7.4 and 1.3 Hz, 1H), 4.97 (s br, 1H), 4.65 (s, 2H), 4.01 (s, 2H), 3.58 (s, 2H), 1.25 (s, 9H) ppm. **^{13}C NMR (100 MHz, $CDCl_3$) δ** : 170.5 (s), 149.8 (s), 137.5 (s), 136.9 (s), 129.8 (d), 129.3 (d, 2C), 128.6 (d, 2C), 128.5 (d), 127.7 (d), 125.5 (d), 123.2 (d), 81.9 (s), 63.9 (t), 61.0 (t), 55.3 (t), 27.9 (q, 3C) ppm. **MS (IE) m/z (%)**: 327 (M^+ , 19), 271 (22), 196 (32), 195 (36), 194 (53), 118 (58), 91 (100), 59 (25), 57 (56), 56 (68). **HRMS**: Calcd. for $C_{20}H_{26}NO_3$: (MH) $^+$, 328.1907. Found: 328.1909.

tert-Butyle 2-{benzyl[2-(hydroxymethyl)-4-methylphenyl]amino}acetate **20c**



General procedure 1: After flash chromatography (PE/EtOAc 8/2), **20c** (361 mg, 1.06 mmol) was obtained by alkylation of (2-(benzylamino)-5-methylphenyl)methanol (454 mg, 2.00 mmol) by *tert*-butyle bromoacetate and **20c** was isolated as a colorless oil (53%). **IR ν (neat):** 3324, 2945, 2898, 1712, 1532, 1493, 1421, 1365, 1295, 1104, 1075 cm^{-1} . **^1H NMR (400 MHz, CDCl_3) δ :** 7.34–7.27 (m, 5H), 7.10–7.04 (m, 3H), 4.68 (s, 2H), 4.06 (s, 2H), 3.64 (s, 2H), 2.30 (s, 3H), 1.34 (s, 9H) ppm. **^{13}C NMR (100 MHz, CDCl_3) δ :** 170.5 (s), 147.2 (s), 137.3 (s), 137.0 (s), 135.1 (s), 130.5 (d), 129.3 (d, 2C), 129.0 (d), 128.5 (d, 2C), 127.6 (d), 123.0 (d), 81.8 (s), 64.0 (t), 61.2 (t), 55.5 (t), 27.9 (q, 3C), 20.9 (q) ppm. **HRMS:** *Calcd. for $\text{C}_{21}\text{H}_{28}\text{NO}_3$: (MH) $^+$* , 342.2064. Found: 342.2068.

tert-Butyle 2-{*N*-[2-(Hydroxymethyl)phenyl](4-methylbenzene)sulfonamido}acetate **20d**

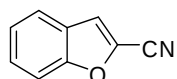


General procedure 1: After flash chromatography (PE/EtOAc 7/3), **20d** (633 mg, 1.62 mmol) was obtained by alkylation of *N*-(2-(hydroxymethyl)phenyl)-4-methylbenzenesulfonamide (544 mg, 2.00 mmol) by *tert*-butyle bromoacetate and **20d** was isolated as a yellow oil (81%). **IR ν (neat):** 3436, 2978, 1733, 1598, 1452, 1347, 1222, 1153, 1090, 1014 cm^{-1} . **^1H NMR (400 MHz, CDCl_3) δ :** 7.57 (dd, J = 7.6 and 1.6 Hz, 1H), 7.51 (dm, J = 8.3 Hz, 2H), 7.33 (ddd, J = 7.5, 7.5 and 1.2 Hz, 1H), 7.28 (dm, J = 8.6 Hz, 2H), 7.13 (ddd, J = 7.6, 7.6 and 1.6 Hz, 1H), 6.52 (dd, J = 8.0 and 1.5 Hz, 1H), 5.01 (d, J = 11.2 Hz, 1H), 4.77 (d, J = 11.2 Hz, 1H), 4.41 (d, J = 16.9 Hz, 1H), 3.94 (d, J = 16.6 Hz, 1H), 3.76 (s br, 1H), 2.45 (s, 3H), 1.39 (s, 9H) ppm. **^{13}C NMR (100 MHz, CDCl_3) δ :** 167.8 (s), 144.3 (s), 142.6 (s), 138.3 (s), 134.0 (s), 131.5 (d), 129.6 (d, 2C), 129.3 (d), 128.4 (d), 128.3 (d, 2C), 127.4 (d), 82.9 (s), 61.7 (t), 54.2 (t), 27.9 (q, 3C), 21.6 (q) ppm. **HRMS :** *Calcd. for $\text{C}_{20}\text{H}_{25}\text{NO}_5\text{SNa}$: (MNa) $^+$* , 414.1346. Found: 414.1345.

Preparation of the cyclized products

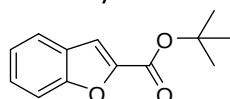
General procedure 3 for cyclization of benzylic alcohols: To a solution of the benzylic alcohol (0.5 mmol, 1 equiv) in 1,4-dioxane (2 mL) were successively added *p*-benzoquinone (0.55 mmol, 1.1 equiv), [IrCp*Cl₂]₂ (0.0125 mmol, 0.025 equiv) and Cs₂CO₃ (0.75 mmol, 1.5 equiv). The reaction media was heated in a sealed tube for 20 h at 110 °C, cooled to rt and then concentrated under reduced pressure. The residue was purified by flash chromatography on silica gel using PE/Et₂O and the cyclized product was obtained.

1-Benzofuran-2-carbonitrile **2**⁴



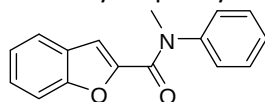
General procedure 3: After flash chromatography (PE/Et₂O 98/2), **2** (46 mg, 0.32 mmol) was obtained from **1** (100 mg, 0.61 mmol) and **2** was isolated as a colorless oil (53%). **IR ν (neat):** 2926, 2233, 1614, 1557, 1476, 1447 cm⁻¹. **¹H NMR (400 MHz, CDCl₃) δ:** 7.68 (dm, *J* = 7.8 Hz, 1H), 7.56 (dm, *J* = 8.4 Hz, 1H), 7.51 (ddd, *J* = 8.2, 6.8 and 1.3 Hz, 1H), 7.46 (d, *J* = 0.9 Hz, 1H), 7.37 (ddd, *J* = 8.0, 6.9 and 1.2 Hz, 1H) ppm. **¹³C NMR (100 MHz, CDCl₃) δ:** 155.7 (s), 128.5 (d), 127.3 (s), 125.5 (s), 124.6 (d), 122.6 (d), 118.5 (d), 112.1 (d), 111.9 (s) ppm. **MS (IE) *m/z* (%):** 143 (M⁺, 100), 115 (57), 114 (27), 88 (34), 63 (42), 62 (35).

tert-Butyle 1-benzofuran-2-carboxylate **8**



General procedure 3: After flash chromatography (PE/Et₂O 98/2), **8** (107 mg, 0.49 mmol) was obtained from **5** (119 mg, 0.5 mmol) and **8** was isolated as a colorless oil (98%). **IR ν (neat):** 2943, 1720, 1583, 1476, 1366, 1310, 1269, 1134, 1105, 1065 cm⁻¹. **¹H NMR (400 MHz, CDCl₃) δ:** 7.65 (ddd, *J* = 7.9, 1.3 and 0.7 Hz, 1H), 7.57 (ddd, *J* = 8.2, 1.8 and 0.9 Hz, 1H), 7.42 (d, *J* = 1.0 Hz, 1H), 7.41 (ddd, *J* = 8.4, 7.2 and 1.4 Hz, 1H), 7.27 (ddd, *J* = 8.1, 7.2 and 1.0 Hz, 1H), 1.63 (s, 9H) ppm. **¹³C NMR (100 MHz, CDCl₃) δ:** 158.9 (s), 155.6 (s), 146.8 (s), 127.2 (d), 127.1 (s), 123.6 (d), 122.6 (d), 113.0 (d), 112.3 (d), 82.6 (s), 28.2 (q, 3C) ppm. **MS (IE) *m/z* (%):** 218 (M⁺, 13), 163 (10), 162 (100), 145 (44), 134 (13), 90 (11), 89 (53), 63 (25), 57 (17). **HRMS: Calcd. for C₁₃H₁₄O₃Na: (MNa)⁺, 241.0841. Found: 241.0847.**

N-Methyl-*N*-phenyl-1-benzofuran-2-carboxamide **9**

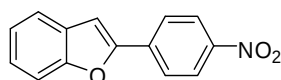


General procedure 3: After flash chromatography (PE/Et₂O 8/2), **9** (74 mg, 0.29 mmol) was obtained from **6** (135 mg, 0.5 mmol) and **9** was isolated as a colorless oil (59%). **IR ν (neat):** 3023, 2965, 1695, 1540, 1432, 1322, 1265, 1201, 1115, 1054, 1021 cm⁻¹. **¹H NMR (400 MHz, CDCl₃) δ:** 7.45–7.34 (m, 5H), 7.30 (ddd, *J* = 8.5, 7.3 and 1.3 Hz, 1H), 7.27–7.24 (m, 2H), 7.17 (ddd, *J* = 8.0, 7.0 and 1.0 Hz, 1H), 6.28 (s, 1H), 3.50 (s, 3H) ppm. **¹³C NMR (100 MHz, CDCl₃) δ:** 160.0 (s), 154.4 (s), 148.1 (s), 144.0 (s), 129.7 (d, 2C), 128.0 (d), 127.3 (d, 2C), 127.0 (s), 126.5 (d), 123.3 (d), 122.3 (d), 112.2 (d), 111.9 (d), 38.7 (q) ppm. **MS (IE) *m/z* (%):** 251 (M⁺, 39), 158 (13), 145 (100), 89 (45), 77 (12), 63 (10). **HRMS: Calcd. for C₁₆H₁₄O₂N: (MH)⁺, 252.1019. Found: 252.1022.**

2-(4-Nitrophenyl)-1-benzofurane **10**⁵

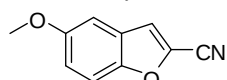
⁴ Ushijima, S.; Togo, H. *Synlett* **2010**, 1562–1566.

⁵ Hercouet, A.; Corre, M. L. *Tetrahedron* **1981**, 37, 2867–2874.



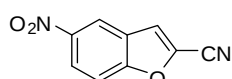
General procedure 3: After flash chromatography (PE/Et₂O 98/2), **10** (109 mg, 0.46 mmol) was obtained from **7** (129 mg, 0.5 mmol) and **10** was isolated as a colorless oil (91%). **IR ν (neat):** 3086, 2935, 1598, 1513, 1333, 1168, 1108, 1029 cm⁻¹. **¹H NMR (400 MHz, CDCl₃) δ :** 8.32 (dm, J = 9.0 Hz, 2H), 8.01 (dm, J = 9.0 Hz, 2H), 7.65 (ddd, J = 7.8, 1.3 and 0.7 Hz, 1H), 7.56 (ddd, J = 8.2, 1.7 and 0.9 Hz, 1H), 7.37 (ddd, J = 8.5, 7.2 and 1.5 Hz, 1H), 7.29 (ddd, J = 7.7, 7.7 and 1.0 Hz, 1H), 7.25 (d, J = 9.0 Hz, 1H) ppm. **¹³C NMR (100 MHz, CDCl₃) δ :** 155.4 (s), 153.3 (s), 147.2 (s), 136.3 (s), 128.7 (s), 125.8 (d), 125.2 (d, 2C), 124.3 (d, 2C), 123.6 (d), 121.6 (d), 111.5 (d), 105.1 (d) ppm. **MS (IE) m/z (%):** 239 (M⁺, 100), 209 (59), 165 (65), 163 (22).

5-Methoxy-1-benzofuran-2-carbonitrile **13a**⁶



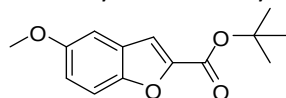
General procedure 3: After flash chromatography (PE/Et₂O 98/2), **13a** (53 mg, 0.31 mmol) was obtained from **11a** (96 mg, 0.5 mmol) and **13a** was isolated as a colorless oil (62%). **IR ν (neat):** 3132, 2943, 2230, 1593, 1560, 1475, 1440, 1334, 1303, 1265, 1207, 1186, 1033 cm⁻¹. **¹H NMR (400 MHz, CDCl₃) δ :** 7.44 (dm, J = 9.0 Hz, 1H), 7.39 (d, J = 0.9 Hz, 1H), 7.12 (dd, J = 9.0 and 2.5 Hz, 1H), 7.05 (d, J = 2.5 Hz, 1H), 3.86 (s, 3H) ppm. **¹³C NMR (100 MHz, CDCl₃) δ :** 157.1 (s), 150.8 (s), 127.8 (s), 126.1 (s), 118.5 (d), 118.4 (d), 112.7 (d), 111.9 (s), 103.3 (d), 55.9 (q) ppm. **MS (IE) m/z (%):** 173 (M⁺, 100), 158 (78), 143 (17), 130 (46), 102 (57), 76 (21), 75 (23), 51 (16), 50 (11).

5-Nitro-1-benzofuran-2-carbonitrile **13b**⁶



General procedure 3: After flash chromatography (PE/Et₂O 98/2), **13b** (86 mg, 0.46 mmol) was obtained from **11b** (104 mg, 0.5 mmol) and **13b** was isolated as a white solid (92%). **Tf:** 118 °C. **IR ν (neat):** 3119, 3092, 2920, 2237, 1518, 1342, 1250, 1184, 1135, 1067 cm⁻¹. **¹H NMR (400 MHz, CDCl₃) δ :** 8.66 (dm, J = 2.3 Hz, 1H), 8.45 (dd, J = 9.0 and 2.3 Hz, 1H), 7.71 (ddd, J = 9.4, 0.8 and 0.8 Hz, 1H), 7.63 (d, J = 0.9 Hz, 1H) ppm. **¹³C NMR (100 MHz, CDCl₃) δ :** 157.8 (s), 145.3 (s), 130.4 (s), 125.9 (s), 123.8 (d), 119.3 (d), 118.8 (d), 112.9 (d), 110.5 (s) ppm. **MS (IE) m/z (%):** 188 (M⁺, 81), 158 (23), 142 (47), 130 (24), 114 (100), 102 (22), 88 (36), 87 (32), 64 (11), 63 (25), 62 (23), 61 (13).

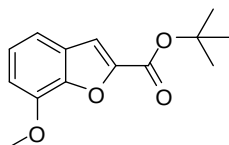
tert-Butyle 5-methoxy-1-benzofuran-2-carboxylate **14a**



General procedure 3: After flash chromatography (PE/Et₂O 98/2), **14a** (110 mg, 0.44 mmol) was obtained from **12a** (134 mg, 0.5 mmol) and **14a** was isolated as a colorless oil (89%). **IR ν (neat):** 2978, 1711, 1561, 1312, 1237, 1223, 1209, 1164, 1145, 1096 cm⁻¹. **¹H NMR (400 MHz, CDCl₃) δ :** 7.46 (ddd, J = 8.7, 0.9 and 0.9 Hz, 1H), 7.36 (d, J = 1.0 Hz, 1H), 7.06–7.01 (m, 2H), 3.85 (s, 3H), 1.62 (s, 9H) ppm. **¹³C NMR (100 MHz, CDCl₃) δ :** 157.8 (s), 155.3 (s), 149.7 (s), 146.4 (s), 126.5 (s), 116.0 (d), 112.0 (d), 111.9 (d), 102.7 (d), 81.5 (s), 54.8 (q), 27.2 (q, 3C) ppm. **MS (IE) m/z (%):** 248 (M⁺, 21), 193 (11), 192 (100), 177 (37), 119 (11). **HRMS: Calcd. for C₁₄H₁₆O₄Na: (MNa)⁺, 271.0941. Found: 271.0941.**

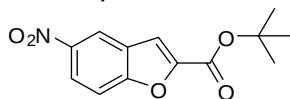
tert-Butyle 7-methoxy-1-benzofuran-2-carboxylate **14b**

⁶ Zhou, W.; Che, W.; Wang, L. *Org. Biomol. Chem.* **2012**, *10*, 4172–4178.



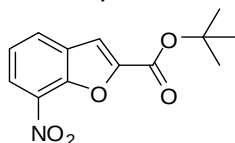
General procedure 3: After flash chromatography (PE/Et₂O 98/2), **14b** (103 mg, 0.42 mmol) was obtained from **12b** (134 mg, 0.5 mmol) and **14b** was isolated as a colorless oil (83%). **IR v (neat):** 2978, 1719, 1577, 1491, 1367, 1310, 1202, 1151, 1091 cm⁻¹. **¹H NMR (400 MHz, CDCl₃) δ:** 7.41 (s, 1H), 7.22 (dd, *J* = 8.0 and 1.5 Hz, 1H), 7.18 (dd, *J* = 7.8 and 7.8 Hz, 1H), 6.89 (dd, *J* = 7.5 and 1.5 Hz, 1H), 4.01 (s, 3H), 1.62 (s, 9H) ppm. **¹³C NMR (100 MHz, CDCl₃) δ:** 158.6 (s), 147.1 (s), 145.9 (s), 145.2 (s), 128.8 (s), 124.3 (d), 114.5 (d), 113.2 (d), 108.8 (d), 82.6 (s), 56.1 (q), 28.2 (q, 3C) ppm. **MS (IE) *m/z* (%):** 248 (M⁺, 17), 193 (11), 192 (100), 176 (17), 175 (15), 149 (10). **HRMS:** Calcd. for C₁₄H₁₆O₄Na: (MNa)⁺, 271.0941. Found: 271.0943.

tert-Butyle 5-nitro-1-benzofuran-2-carboxylate **14d**⁷



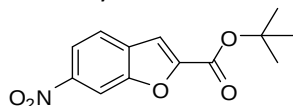
General procedure 3: After flash chromatography (PE/Et₂O 98/2), **14d** (127 mg, 0.48 mmol) was obtained from **12d** (141 mg, 0.5 mmol) and **14d** was isolated as a white solid (97%). **Tf:** 121 °C. **IR v (neat):** 2983, 2935, 1733, 1710, 1525, 1342, 1313, 1262, 1155, 1097, 1064 cm⁻¹. **¹H NMR (400 MHz, CDCl₃) δ:** 8.60 (d, *J* = 2.4 Hz, 1H), 8.33 (dd, *J* = 9.1 and 2.0 Hz, 1H), 7.66 (d, *J* = 8.9 Hz, 1H), 7.53 (s, 1H), 1.63 (s, 9H) ppm. **¹³C NMR (100 MHz, CDCl₃) δ:** 157.9 (s), 157.8 (s), 149.8 (s), 144.7 (s), 127.4 (s), 122.6 (d), 119.3 (d), 113.1 (d), 112.9 (d), 83.7 (s), 28.1 (q, 3C) ppm. **MS (IE) *m/z* (%):** 263 (M⁺, 17), 208 (24), 207 (100), 190 (33), 177 (21), 161 (24), 144 (17), 88 (21), 62 (15), 57 (48), 56 (86).

tert-Butyle 7-nitro-1-benzofuran-2-carboxylate **14e**⁸



General procedure 3: After flash chromatography (PE/Et₂O 98/2), **14e** (123 mg, 0.47 mmol) was obtained from **12e** (141 mg, 0.5 mmol) and **14e** was isolated as a white solid (93%). **Tf:** 124 °C. **IR v (neat):** 2978, 1725, 1524, 1329, 1287, 1166, 1152, 1103 cm⁻¹. **¹H NMR (400 MHz, CDCl₃) δ:** 8.29 (dd, *J* = 8.1 and 1.1 Hz, 1H), 8.00 (dd, *J* = 7.8 and 1.2 Hz, 1H), 7.54 (s, 1H), 7.44 (dd, *J* = 8.0 and 8.0 Hz, 1H), 1.64 (s, 9H) ppm. **¹³C NMR (100 MHz, CDCl₃) δ:** 157.6 (s), 149.4 (s), 147.3 (s), 134.4 (s), 131.0 (s), 129.5 (d), 123.6 (d), 123.4 (d), 112.3 (d), 83.6 (s), 28.2 (q, 3C) ppm. **MS (IE) *m/z* (%):** 263 (M⁺, 16), 208 (26), 207 (81), 191 (23), 190 (48), 177 (20), 88 (22), 57 (69), 56 (100).

tert-Butyle 6-nitro-1-benzofuran-2-carboxylate **14f**



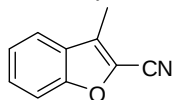
General procedure 3: After flash chromatography (PE/Et₂O 98/2), **14f** (121 mg, 0.46 mmol) was obtained from **12f** (141 mg, 0.5 mmol) and **14f** was isolated as a white solid (92%). **Tf:** 115 °C. **IR v (neat):** 2982, 2917, 1713, 1524, 1326, 1228, 1150, 1095, 1062 cm⁻¹. **¹H NMR (400 MHz, CDCl₃) δ:** 8.48 (m, 1H), 8.22 (dd, *J* = 8.7 and 2.0 Hz, 1H), 7.79 (dd, *J* = 8.6 and 0.5 Hz, 1H), 7.49 (d, *J* = 1.0 Hz, 1H), 1.64 (s, 9H) ppm. **¹³C NMR (100 MHz, CDCl₃) δ:** 157.8 (s), 154.0 (s), 151.4 (s), 146.9 (s), 132.7 (s),

⁷ Baraldi, P. G.; Romagnoli, R.; Beria, I.; Cozzi, P.; Geroni, C.; Mongelli, N.; Bianchi, N.; Mischiati, C.; Gambari, R. *J. Med. Chem.* **2000**, 43, 2675–2684.

⁸ Gensini, M.; Altamura, M.; Dimoulas, T.; Fedi, V.; Giannotti, D.; Guidi, A.; Harmat, N. J. S.; Nannicini, R.; Pasqui, F.; Triolo, A.; Giuliani, S.; Meini, S.; Tramontana, M.; Maggi, C. A. *ChemMedChem* **2010**, 5, 65–78.

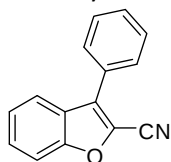
122.9 (d), 119.1 (d), 112.2 (d), 108.8 (d), 83.8 (s), 28.1 (q, 3C) ppm. **MS (IE) m/z (%)**: 263 (M^+ , 20), 208 (27), 207 (95), 190 (36), 177 (49), 88 (27), 56 (100). **HRMS**: Calcd. for $C_{13}H_{13}NO_5Na$: (MNa) $^+$, 286.0686. Found: 286.0688.

3-Methyl-1-benzofuran-2-carbonitrile **17a**⁹



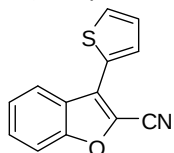
General procedure 3: After flash chromatography (PE/Et₂O 98/2), **17a** (55 mg, 0.35 mmol) was obtained from **15a** (88 mg, 0.5 mmol) and **17a** was isolated as a colorless oil (70%). **IR ν (neat)**: 2929, 2218, 1594, 1444, 1388, 1340, 1245, 1191, 1102 cm⁻¹. **¹H NMR (400 MHz, CDCl₃) δ** : 7.52 (m, 1H), 7.44–7.36 (m, 2H), 7.28 (m, 1H), 2.39 (s, 3H) ppm. **¹³C NMR (100 MHz, CDCl₃) δ** : 155.4 (s), 129.8 (s), 128.4 (d), 126.9 (s), 124.9 (s), 124.0 (d), 120.9 (d), 112.1 (d), 111.9 (s), 8.8 (q) ppm. **MS (IE) m/z (%)**: 157 (M^+ , 100), 158 (89), 102 (45), 51 (29).

3-Phenyl-1-benzofuran-2-carbonitrile **17b**¹⁰



General procedure 3: After flash chromatography (PE/Et₂O 98/2), **17b** (88 mg, 0.40 mmol) was obtained from **15b** (119 mg, 0.5 mmol) and **17b** was isolated as a colorless oil (80%). **IR ν (neat)**: 3061, 2922, 2851, 2226, 1444, 1336, 1249, 1201, 1109, 1077 cm⁻¹. **¹H NMR (400 MHz, CDCl₃) δ** : 7.83 (dm, J = 8.2 Hz, 1H), 7.77–7.72 (m, 2H), 7.61–7.48 (m, 5H), 7.40 (ddd, J = 8.0, 6.5 and 1.2 Hz, 1H) ppm. **¹³C NMR (100 MHz, CDCl₃) δ** : 155.8 (s), 133.3 (s), 129.6 (d), 129.4 (d, 2C), 128.7 (d), 128.6 (s), 128.4 (d, 2C), 125.2 (s), 124.6 (d), 123.5 (s), 121.9 (d), 112.6 (s), 112.4 (d) ppm. **MS (IE) m/z (%)**: 219 (M^+ , 100), 190 (42), 164 (18), 163 (16), 81 (18), 63 (10). **HRMS**: Calcd. for $C_{15}H_9NONa$: (MNa) $^+$, 242.0576. Found: 242.0574.

3-(Thiophen-2-yl)-1-benzofuran-2-carbonitrile **17c**

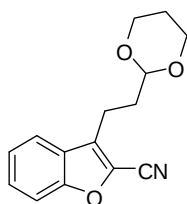


General procedure 3: After flash chromatography (PE/Et₂O 95/5), **17c** (68 mg, 0.30 mmol) was obtained from **15c** (122 mg, 0.5 mmol) and **17c** was isolated as a rose solid (60%). **Tf**: 102 °C. **IR ν (neat)**: 3088, 2923, 2217, 1614, 1446, 1429, 1340, 1248, 1226, 1189, 1083 cm⁻¹. **¹H NMR (400 MHz, CDCl₃) δ** : 8.02 (ddd, J = 8.1, 1.0 and 1.0 Hz, 1H), 7.73 (dd, J = 3.8 and 1.0 Hz, 1H), 7.59–7.53 (m, 3H), 7.44 (m, 1H), 7.25 (dd, J = 4.5 and 3.0 Hz, 1H) ppm. **¹³C NMR (100 MHz, CDCl₃) δ** : 155.7 (s), 129.6 (s), 128.9 (d), 128.2 (d), 127.8 (d), 127.7 (d), 126.9 (s), 124.7 (d), 124.5 (s), 122.7 (s), 122.2 (d), 112.8 (s), 112.4 (d) ppm. **MS (IE) m/z (%)**: 225 (M^+ , 100), 196 (32), 85 (9). **HRMS**: Calcd. for $C_{13}H_8ONS$: (MH) $^+$, 226.0321. Found: 226.0319.

3-[2-(1,3-Dioxan-2-yl)ethyl]-1-benzofuran-2-carbonitrile **17d**

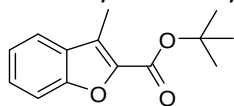
⁹ Ouchaou, K.; Georgin, D.; Taran, F. *Synlett* **2010**, 2083–2086.

¹⁰ Ding, S.; Jiao, N. *J. Am. Chem. Soc.* **2011**, 133, 12374–12377.



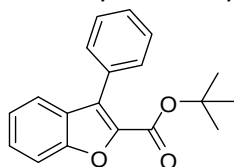
General procedure 3: After flash chromatography (PE/Et₂O 95/5), **17d** (89 mg, 0.35 mmol) was obtained from **15d** (138 mg, 0.5 mmol) and **17d** was isolated as a colorless oil (69%). **IR ν (neat):** 2963, 2852, 2225, 1447, 1376, 1243, 1134, 1003 cm⁻¹. **¹H NMR (400 MHz, CDCl₃) δ:** 7.67 (ddd, *J* = 7.8, 1.0 and 1.0 Hz, 1H), 7.53–7.46 (m, 2H), 7.34 (ddd, *J* = 8.0, 5.9 and 2.2 Hz, 1H), 4.54 (t, *J* = 5.0 Hz, 1H), 4.13 (m, 2H), 3.75 (m, 2H), 3.00 (t, *J* = 7.5 Hz, 2H), 2.17–2.00 (m, 3H), 1.35 (dt, *J* = 13.5, 2.8 and 1.5 Hz, 1H) ppm. **¹³C NMR (100 MHz, CDCl₃) δ:** 155.6 (s), 133.4 (s), 128.3 (d), 126.3 (s), 124.9 (s), 124.0 (d), 121.2 (d), 112.2 (d), 111.8 (s), 100.7 (d), 66.9 (t, 2C), 34.0 (t), 25.7 (t), 18.4 (t) ppm. **MS (IE) *m/z* (%):** 257 (M⁺, 11), 170 (12), 156 (12), 115 (13), 114 (33), 100 (20), 87 (100), 59 (23). **HRMS: Calcd. for C₁₅H₁₅O₃NNa: (MNa)⁺, 280.0944. Found: 280.0947.**

tert-Butyle 3-methyl-1-benzofuran-2-carboxylate **18a**



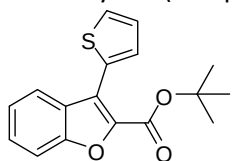
General procedure 3: After flash chromatography (PE/Et₂O 98/2), **18a** (87 mg, 0.37 mmol) was obtained from **16a** (126 mg, 0.5 mmol) and **18a** was isolated as a colorless oil (75%). **IR ν (neat):** 2946, 2835, 1703, 1450, 1367, 1300, 1019 cm⁻¹. **¹H NMR (400 MHz, CDCl₃) δ:** 7.54 (dm, *J* = 7.9 Hz, 1H), 7.42 (dd, *J* = 8.3 and 0.7 Hz, 1H), 7.34 (ddm, *J* = 7.5 and 7.5 Hz, 1H), 7.21 (ddm, *J* = 7.0 and 7.0 Hz, 1H), 2.48 (s, 3H), 1.57 (s, 9H) ppm. **¹³C NMR (100 MHz, CDCl₃) δ:** 159.9 (s), 154.2 (s), 141.9 (s), 129.2 (s), 127.4 (d), 124.3 (s), 123.0 (d), 121.0 (d), 112.2 (d), 82.4 (s), 28.4 (q, 3C), 9.5 (q) ppm. **MS (IE) *m/z* (%):** 232 (M⁺, 16), 176 (100), 159 (24), 131 (55), 103 (23), 102 (20), 77 (30). **HRMS: Calcd. for C₁₄H₁₆O₃Na: (MNa)⁺, 255.0992. Found: 255.0989.**

tert-Butyle 3-Phenyl-1-benzofuran-2-carboxylate **18b**



General procedure 3:¹¹ After flash chromatography (PE/Et₂O 98/2), **18b** (58 mg, 0.20 mmol) was obtained from **16b** (100 mg, 0.32 mmol) and **18b** was isolated as a colorless oil (62%). **IR ν (neat):** 2978, 1711, 1570, 1379, 1368, 1296, 1151, 1137 cm⁻¹. **¹H NMR (400 MHz, CDCl₃) δ:** 7.61 (ddd, *J* = 8.3, 0.8 and 0.8 Hz, 1H), 7.57–7.51 (m, 3H), 7.50–7.40 (m, 4H), 7.28 (ddd, *J* = 8.0, 7.1 and 0.9 Hz, 1H), 1.45 (s, 9H) ppm. **¹³C NMR (100 MHz, CDCl₃) δ:** 159.2 (s), 154.3 (s), 141.4 (s), 131.3 (s), 130.0 (d, 2C), 128.6 (s), 128.2 (d), 128.1 (d, 2C), 128.0 (s), 127.6 (d), 123.6 (d), 122.0 (d), 112.2 (d), 82.5 (s), 28.1 (q, 3C) ppm. **MS (IE) *m/z* (%):** 294 (M⁺, 12), 239 (16), 238 (100), 237 (28), 221 (13), 165 (20), 57 (6). **HRMS: Calcd. for C₁₉H₁₈O₃Na: (MNa)⁺, 317.1148. Found: 317.1152.**

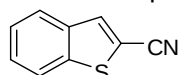
tert-Butyle 3-(Thiophen-2-yl)-1-benzofuran-2-carboxylate **18c**



¹¹ The reaction media was heated for 48h at 110 °C.

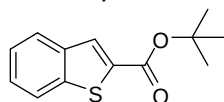
General procedure 3: After flash chromatography (PE/Et₂O 95/5), **18c** (138 mg, 0.46 mmol) was obtained from **16c** (160 mg, 0.5 mmol) and **18c** was isolated as a colorless oil (92%). **IR ν (neat):** 2977, 1709, 1588, 1450, 1367, 1294, 1230, 1134, 1106, 1047 cm⁻¹. **¹H NMR (400 MHz, C₆D₆) δ :** 7.67 (ddd, J = 7.8, 1.1 and 0.7 Hz, 1H), 7.45 (dd, J = 3.6 and 1.2 Hz, 1H), 7.25 (dm, J = 8.2 Hz, 1H), 7.06–7.00 (m, 2H), 6.96 (ddd, J = 8.2, 7.3 and 1.0 Hz, 1H), 6.87 (dd, J = 5.1 and 3.6 Hz, 1H), 1.39 (s, 9H) ppm. **¹³C NMR (100 MHz, C₆D₆) δ :** 158.8 (s), 154.5 (s), 142.3 (s), 131.6 (s), 129.9 (d), 128.6 (s), 127.9 (d), 127.2 (d), 127.0 (d), 123.9 (d), 122.5 (d), 121.5 (s), 112.3 (d), 82.1 (s), 28.1 (q, 3C) ppm. **MS (IE) m/z (%):** 300 (M⁺, 11), 245 (15), 244 (100), 227 (10), 171 (16), 127 (8). **HRMS:** Calcd. for C₁₇H₁₆O₃SNa: (MNa)⁺, 323.0712. Found: 323.0715.

1-Benzothiophene-2-carbonitrile **21a**¹²



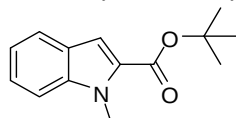
General procedure 3: After flash chromatography (PE/Et₂O 98/2), **21a** (32 mg, 0.20 mmol) was obtained from **19a** (89 mg, 0.5 mmol) and **21a** was isolated as a colorless oil (40%). **IR ν (neat):** 3061, 2215, 1594, 1508, 1425, 1330, 1250, 1189, 1159, 1106 cm⁻¹. **¹H NMR (400 MHz, CDCl₃) δ :** 7.92–7.85 (m, 3H), 7.54 (ddd, J = 8.4, 7.0 and 1.5 Hz, 1H), 7.48 (ddd, J = 7.9, 7.0 and 1.2 Hz, 1H) ppm. **¹³C NMR (100 MHz, CDCl₃) δ :** 141.3 (s), 137.5 (s), 135.0 (d), 127.9 (d), 125.8 (d), 125.3 (d), 122.4 (d), 114.5 (s), 109.7 (s) ppm. **MS (IE) m/z (%):** 159 (M⁺, 100), 132 (9), 115 (11), 79 (8), 69 (10).

tert-Butyle 1-benzothiophene-2-carboxylate **21b**



General procedure 3: After flash chromatography (PE/Et₂O 98/2), **21b** (109 mg, 0.47 mmol) was obtained from **19b** (127 mg, 0.5 mmol) and **21b** was isolated as a pale yellow oil (93%). **IR ν (neat):** 2977, 1702, 1522, 1457, 1367, 1293, 1246, 1149, 1055 cm⁻¹. **¹H NMR (400 MHz, CDCl₃) δ :** 7.96 (d, J = 0.6 Hz, 1H), 7.85–7.80 (m, 2H), 7.41 (ddd, J = 8.4, 7.3 and 1.5 Hz, 1H), 7.37 (ddd, J = 8.4, 7.3 and 1.4 Hz, 1H), 1.61 (s, 9H) ppm. **¹³C NMR (100 MHz, CDCl₃) δ :** 162.0 (s), 142.1 (s), 138.8 (s), 135.8 (s), 129.7 (d), 126.6 (d), 125.4 (d), 124.7 (d), 122.7 (d), 82.3 (s), 28.2 (q, 3C) ppm. **MS (IE) m/z (%):** 234 (M⁺, 20), 177 (100), 160 (48), 133 (14), 89 (35), 57 (11). **HRMS:** Calcd. pour C₁₃H₁₄O₂SNa: (MNa)⁺, 257.0607. Found: 257.0611.

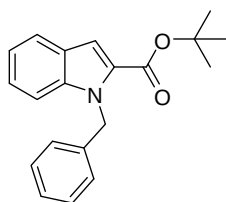
tert-Butyle 1-methyl-1H-indole-2-carboxylate **22a**



General procedure 3: After flash chromatography (PE/Et₂O 9/1), **22a** (96 mg, 0.42 mmol) was obtained from **20a** (125 mg, 0.5 mmol) and **22a** was isolated as a colorless oil (83%). **IR ν (neat):** 2980, 1712, 1454, 1384, 1234, 1184, 1123, 1059 cm⁻¹. **¹H NMR (400 MHz, CDCl₃) δ :** 7.65 (ddd, J = 8.0, 1.0 and 1.0 Hz, 1H), 7.39–7.30 (m, 2H), 7.22 (d, J = 0.8 Hz, 1H), 7.13 (ddd, J = 8.0, 6.5 and 1.5 Hz, 1H), 4.06 (s, 3H), 1.61 (s, 9H) ppm. **¹³C NMR (100 MHz, CDCl₃) δ :** 161.7 (s), 139.5 (s), 129.4 (s), 125.8 (s), 124.6 (d), 122.4 (d), 120.4 (d), 110.2 (d), 109.8 (d), 81.3 (s), 31.6 (q), 28.4 (q, 3C) ppm. **MS (IE) m/z (%):** 231 (M⁺, 18), 176 (11), 175 (100), 174 (14), 130 (21), 129 (16), 89 (35). **HRMS:** Calcd. for C₁₄H₁₇NO₂Na: (MNa)⁺, 254.1157. Found: 254.1151.

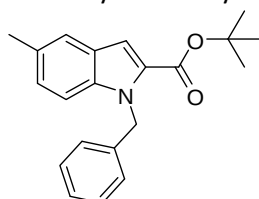
tert-Butyle 1-benzyl-1H-indole-2-carboxylate **22b**

¹² Zhou, S.; Junge, K.; Addis, D.; Das, S.; Beller, M. *Org. Lett.* **2009**, *11*, 2461–2464.



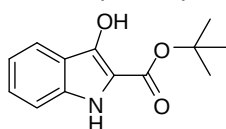
General procedure 3: After flash chromatography (PE/Et₂O 98/2), **22b** (24 mg, 0.08 mmol) was obtained from **20b** (39 mg, 0.12 mmol) and **22b** was isolated as a colorless oil (65%). **IR ν (neat):** 2965, 2934, 1707, 1543, 1487, 1365, 1322, 1251, 1209, 1076, 1022 cm⁻¹. **¹H NMR (400 MHz, CDCl₃) δ:** 7.60 (ddd, *J* = 8.0, 0.9 and 0.9 Hz, 1H), 7.26–7.08 (m, 6H), 7.06 (ddd, *J* = 8.0, 6.7 and 1.2 Hz, 1H), 6.98–6.93 (m, 2H), 5.75 (s, 2H), 1.46 (s, 9H) ppm. **¹³C NMR (100 MHz, CDCl₃) δ:** 161.4 (s), 139.3 (s), 138.4 (s), 129.4 (s), 128.5 (d, 2C), 127.0 (d), 126.2 (d, 2C), 126.1 (s), 124.9 (d), 122.5 (d), 120.7 (d), 110.8 (d), 110.7 (d), 81.5 (s), 47.8 (t), 28.3 (q, 3C) ppm. **MS (IE) *m/z* (%):** 250 (M⁺–*t*-Bu⁺, 6), 249 (21), 194 (18), 193 (76), 57 (49), 56 (100). **HRMS:** Calcd. for C₂₀H₂₁NO₂Na: (MNa)⁺, 330.1470. Found: 330.1463.

tert-Butyle 1-benzyl-5-methyl-1H-indole-2-carboxylate **22c**



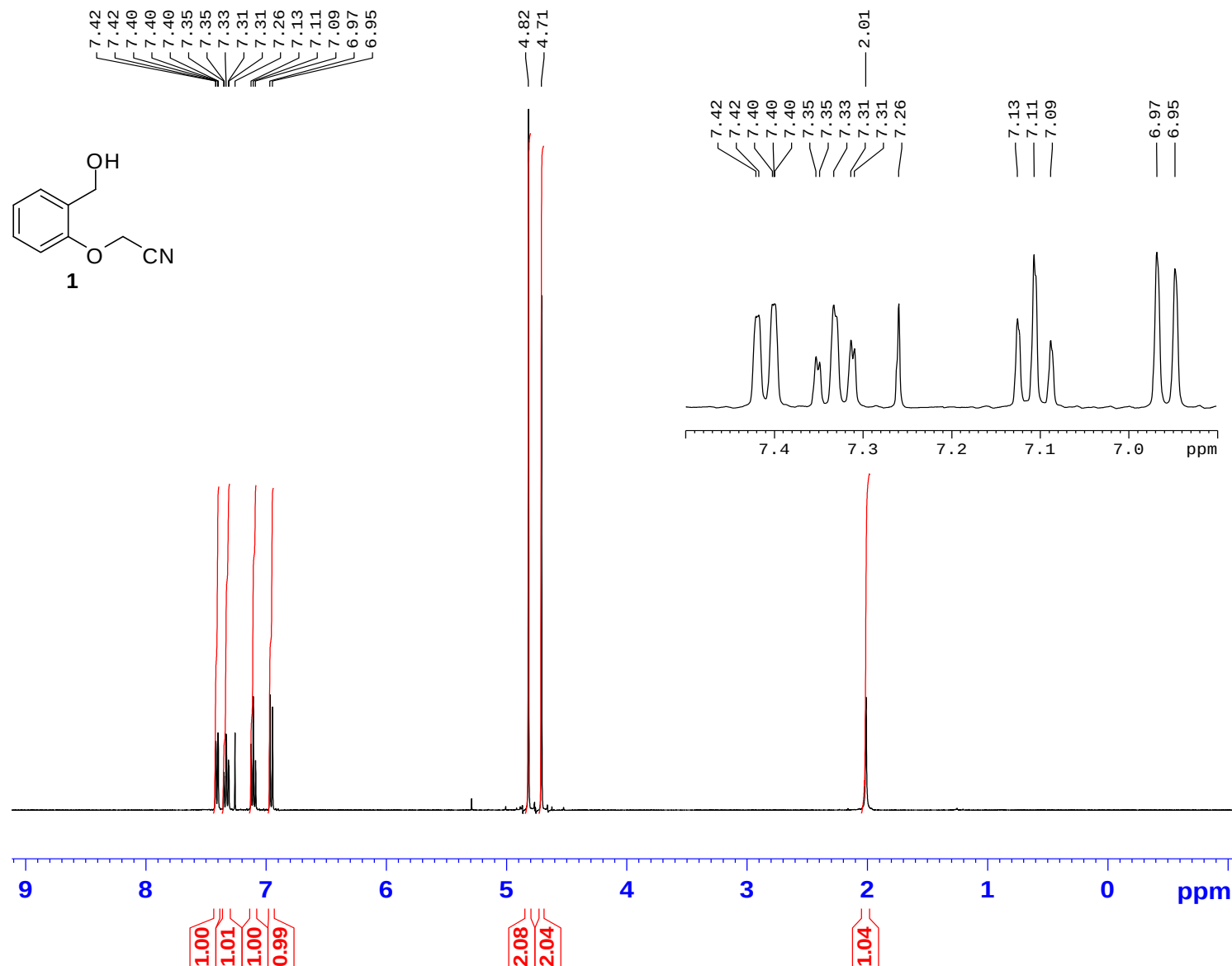
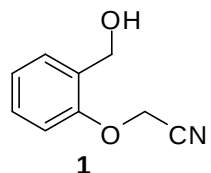
General procedure 3: After flash chromatography (PE/Et₂O 98/2), **22c** (133 mg, 0.41 mmol) was obtained from **20c** (163 mg, 0.5 mmol) and **22c** was isolated as a colorless oil (83%). **IR ν (neat):** 2972, 2927, 1701, 1450, 1367, 1269, 1211, 1145, 1096 cm⁻¹. **¹H NMR (400 MHz, CDCl₃) δ:** 7.46 (m, 1H), 7.27–7.15 (m, 5H), 7.09 (ddm, *J* = 8.5 and 1.8 Hz, 1H), 7.04–7.08 (m, 2H), 5.80 (s, 2H), 2.42 (s, 3H), 1.53 (s, 9H) ppm. **¹³C NMR (100 MHz, CDCl₃) δ:** 161.4 (s), 138.5 (s), 137.8 (s), 130.0 (s), 129.3 (s), 128.5 (d, 2C), 127.0 (d), 126.9 (d), 126.3 (s), 126.2 (d, 2C), 121.8 (d), 110.5 (d), 110.1 (d), 81.4 (s), 47.8 (t), 28.4 (q, 3C), 21.4 (q) ppm. **MS (IE) *m/z* (%):** 264 (M⁺–*t*-Bu⁺, 10), 263 (16), 208 (24), 207 (84), 190 (30), 177 (41), 57 (50), 56 (100). **HRMS:** Calcd. for C₂₁H₂₃NO₂Na: (MNa)⁺, 344.1621. Found: 344.1622.

tert-Butyle 3-hydroxy-1H-indole-2-carboxylate **22d**



General procedure 3: After flash chromatography (PE/EtOAc 8/2), **22d** (65 mg, 0.28 mmol) was obtained from **20d** (175 mg, 0.45 mmol) and **22d** was isolated as a colorless oil (62%). **IR ν (neat):** 3343, 2978, 1686, 1658, 1555, 1368, 1326, 1240, 1132 cm⁻¹. **¹H NMR (400 MHz, CDCl₃) δ:** 8.03 (s br, 2H), 7.73 (d, *J* = 8.1 Hz, 1H), 7.31 (ddd, *J* = 8.4, 6.8 and 1.1 Hz, 1H), 7.25 (d, *J* = 8.3 Hz, 1H), 7.08 (ddd, *J* = 7.3, 6.8 and 1.0 Hz, 1H), 1.64 (s, 9H) ppm. **¹³C NMR (100 MHz, C₆D₆) δ:** 163.4 (s), 135.4 (s), 128.7 (s), 127.1 (d), 120.5 (d), 119.9 (d), 118.5 (s), 112.2 (d), 109.5 (s), 82.0 (s), 28.3 (q, 3C) ppm. **MS (IE) *m/z* (%):** 233 (M⁺, 5), 177 (42), 159 (100), 131 (45), 104 (34), 57 (27). **HRMS:** Calcd. for C₁₃H₁₅NO₃Na: (MNa)⁺, 256.0949. Found: 256.0943.

BA 913



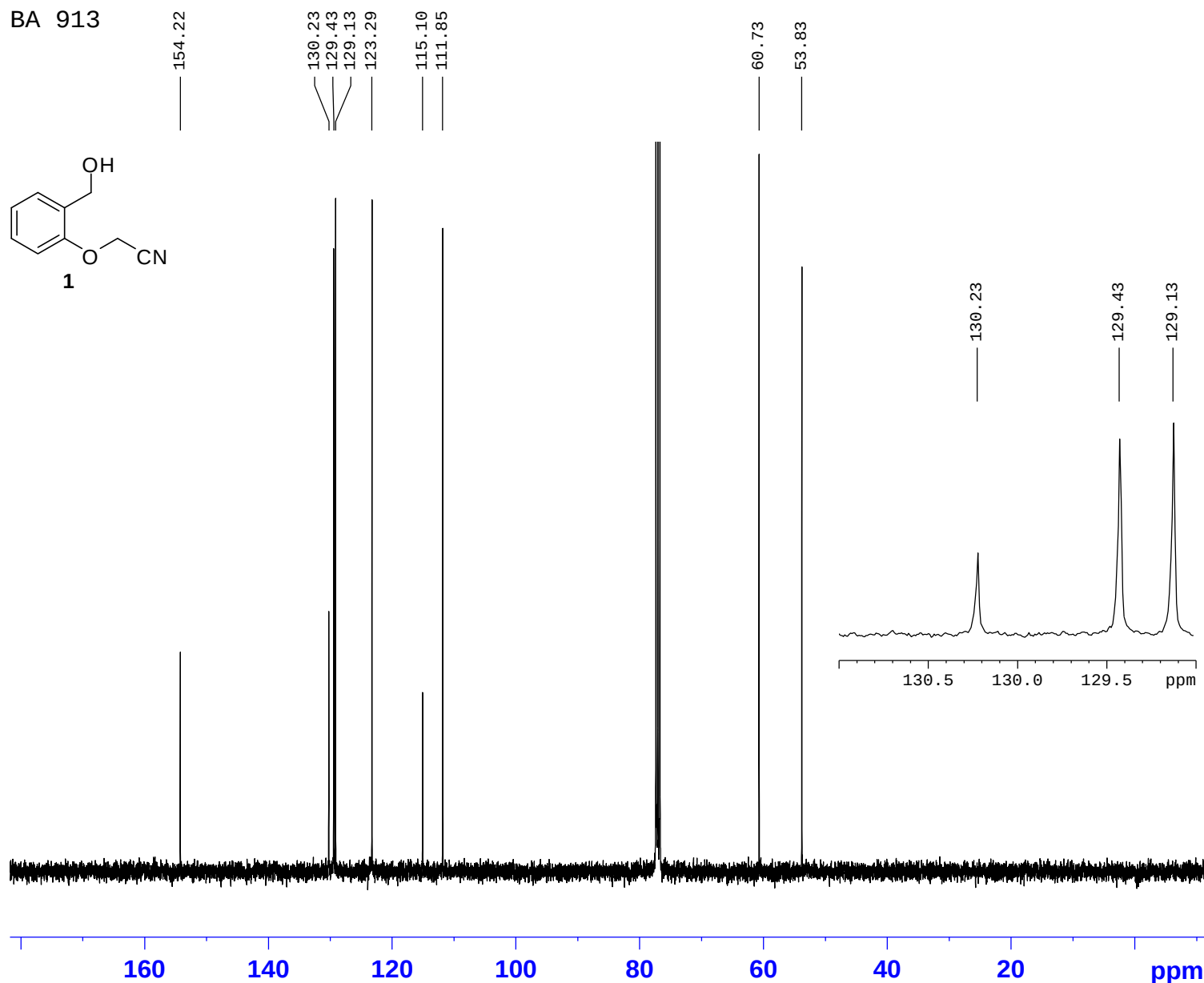
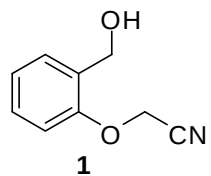
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BA 913



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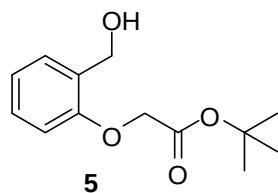
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S20

BA 914



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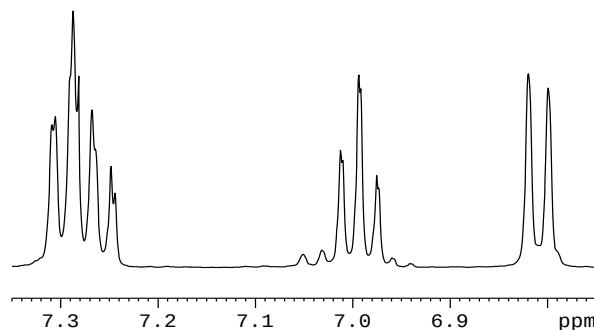
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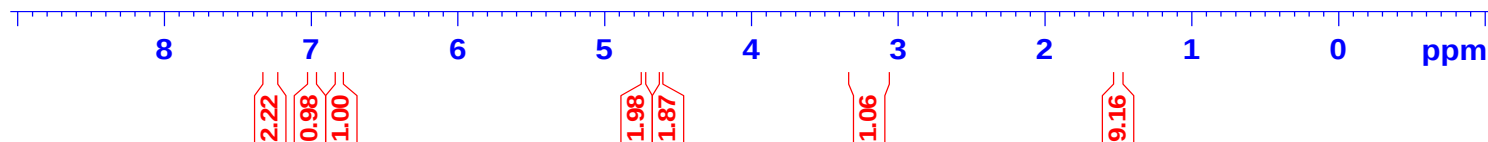


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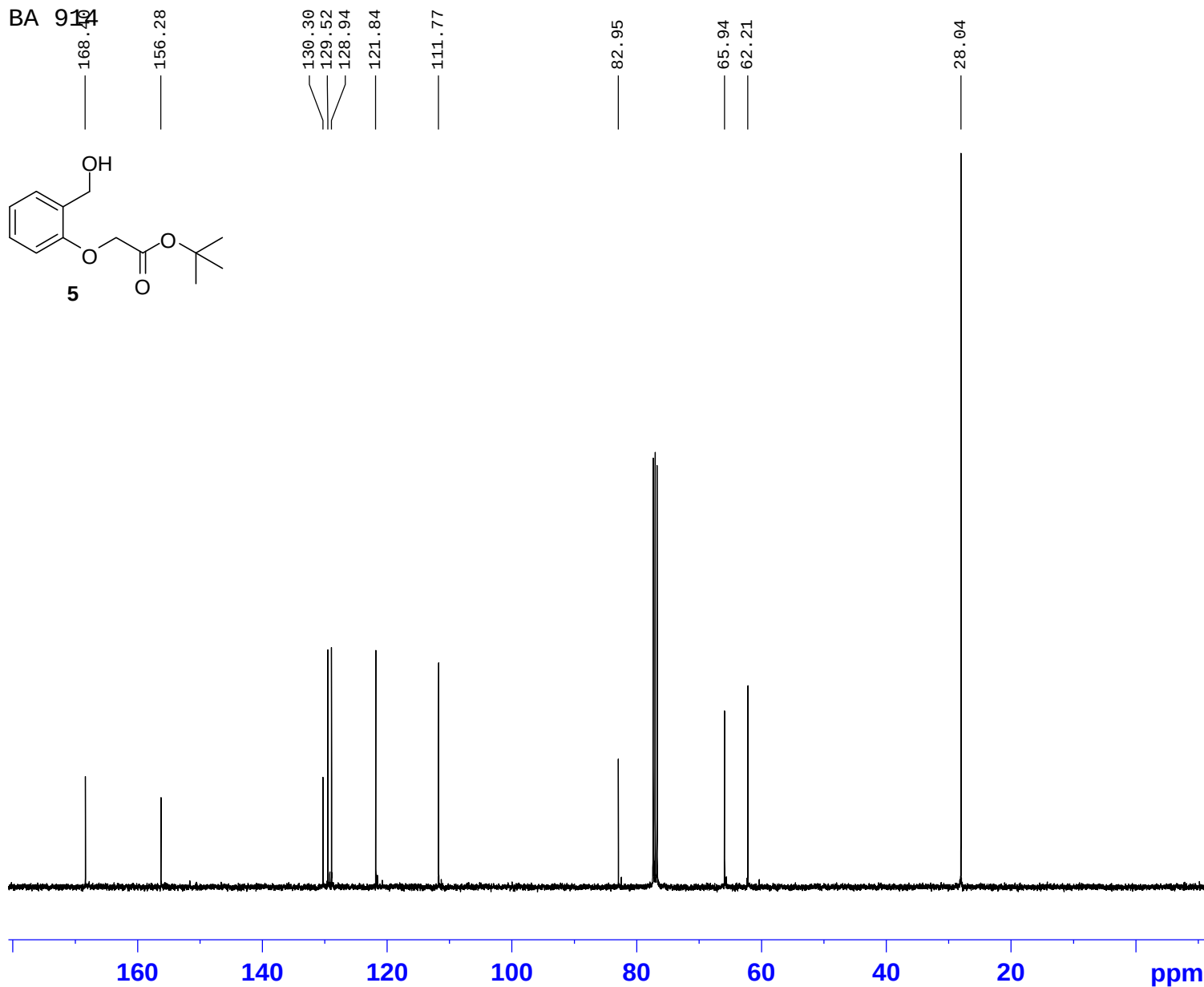
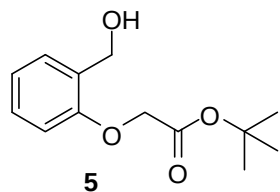
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BA 914



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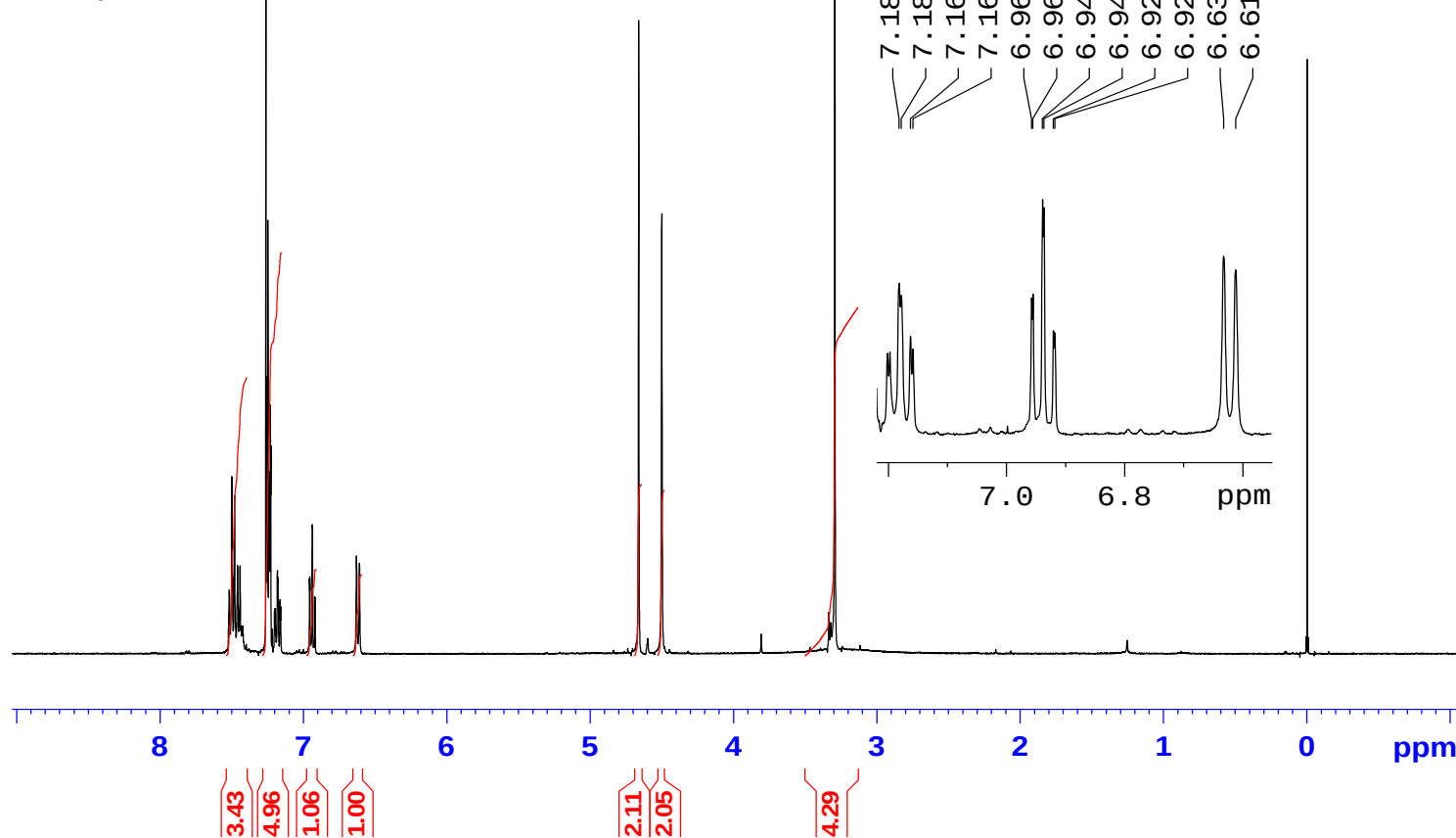
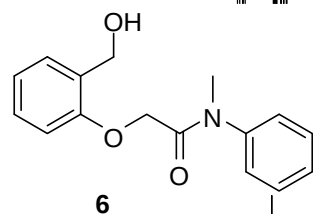
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RG 29193
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DE 10.00 usec
TE 297.9 K
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d11 0.03000000 sec
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DGP BA 1197



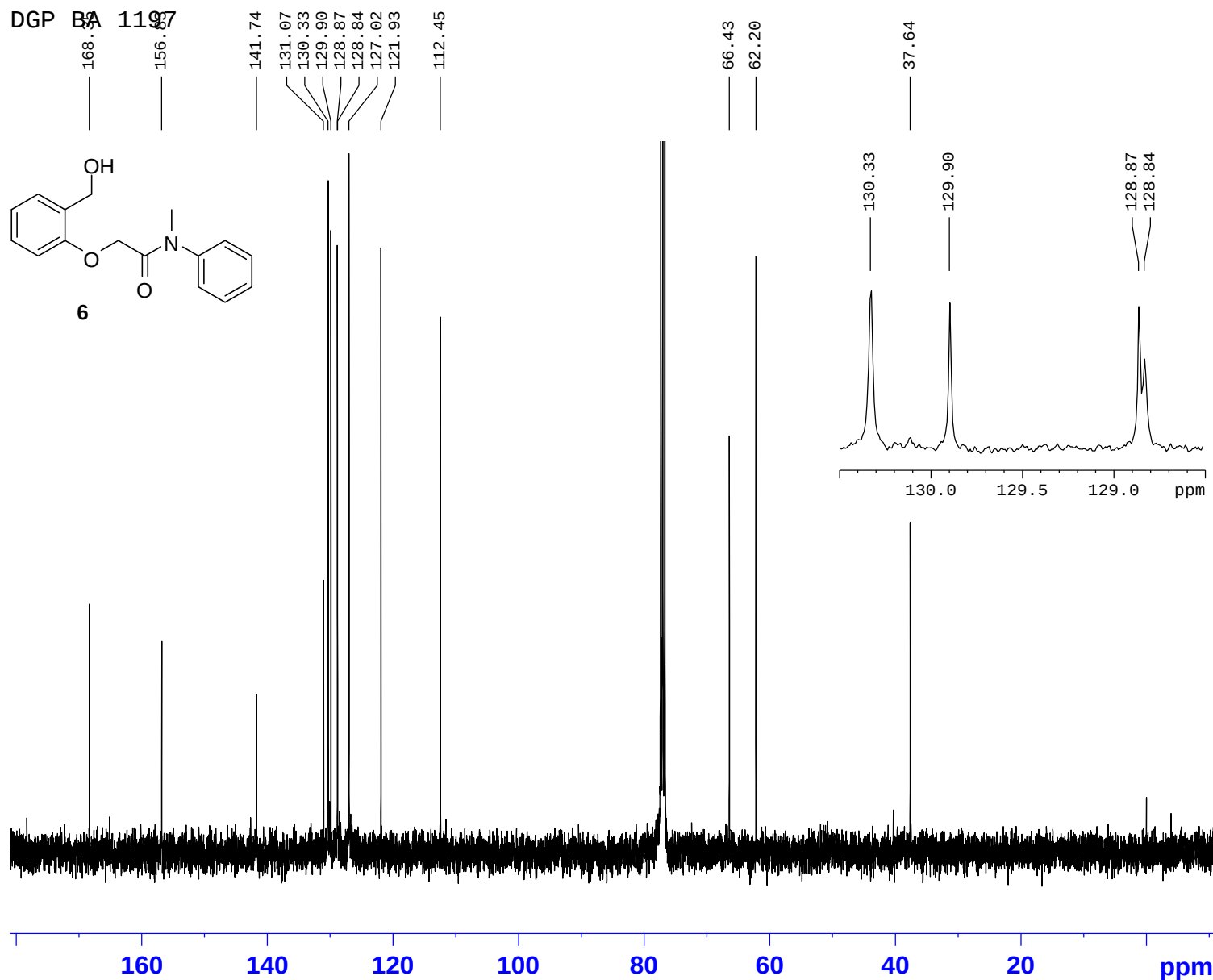
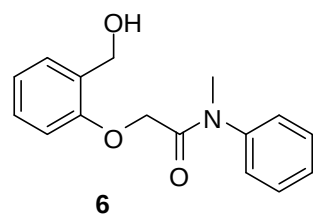
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DGP BA 1197



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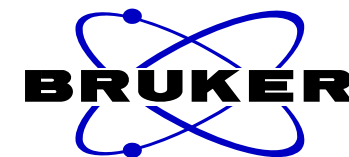
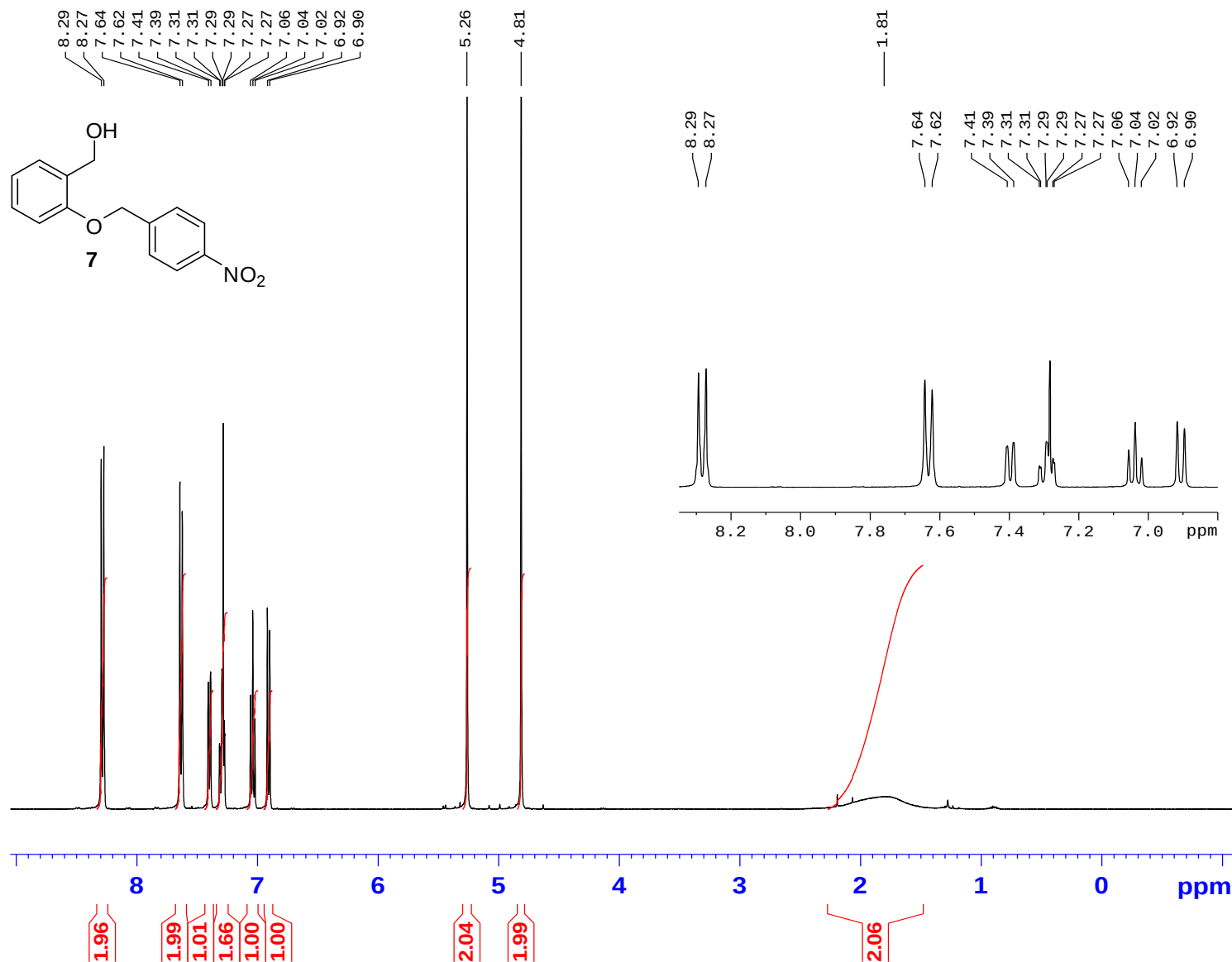
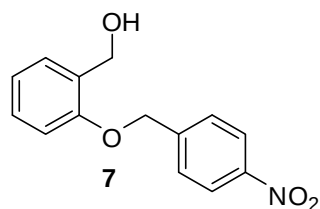
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D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

BA 1260



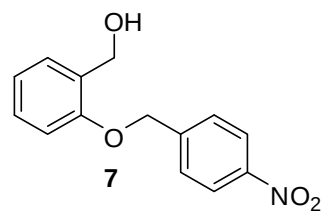
Current Data Parameters
NAME 20120713
EXPNO 672
PROCNO 1

F2 - Acquisition Parameters
Date_ 20120715
Time 20.58
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 362
DW 60.400 usec
DE 10.00 usec
TE 300.0 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

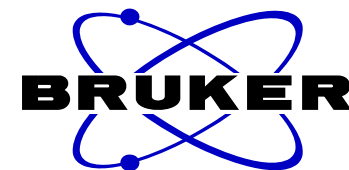
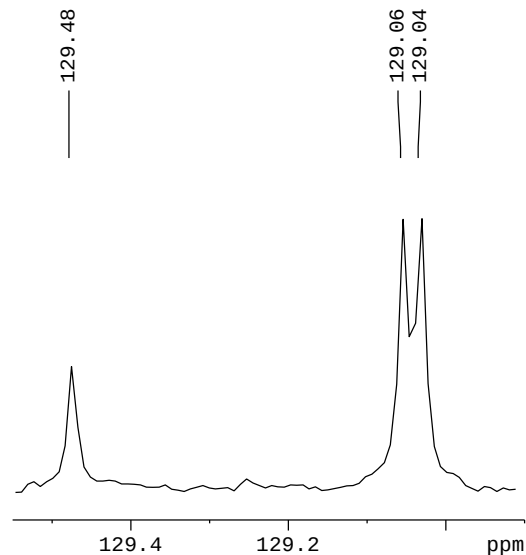
F2 - Processing parameters
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

BA 1260



155.81
147.68
144.21
129.48
129.06
129.04
127.49
123.99
121.64
111.49

68.71
61.69



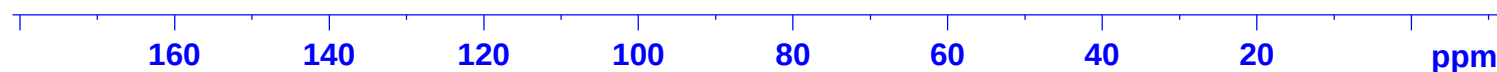
Current Data Parameters
NAME 20120713
EXPNO 670
PROCNO 1

F2 - Acquisition Parameters
Date_ 20120715
Time 20.10
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1600
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 26008
DW 19.100 usec
DE 10.00 usec
TE 296.8 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

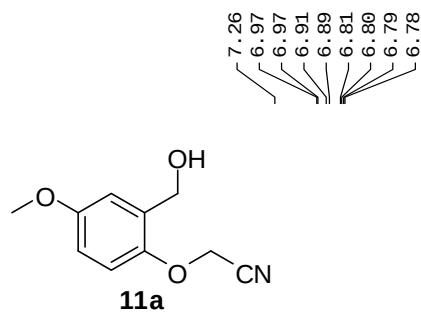
===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



BA 1171

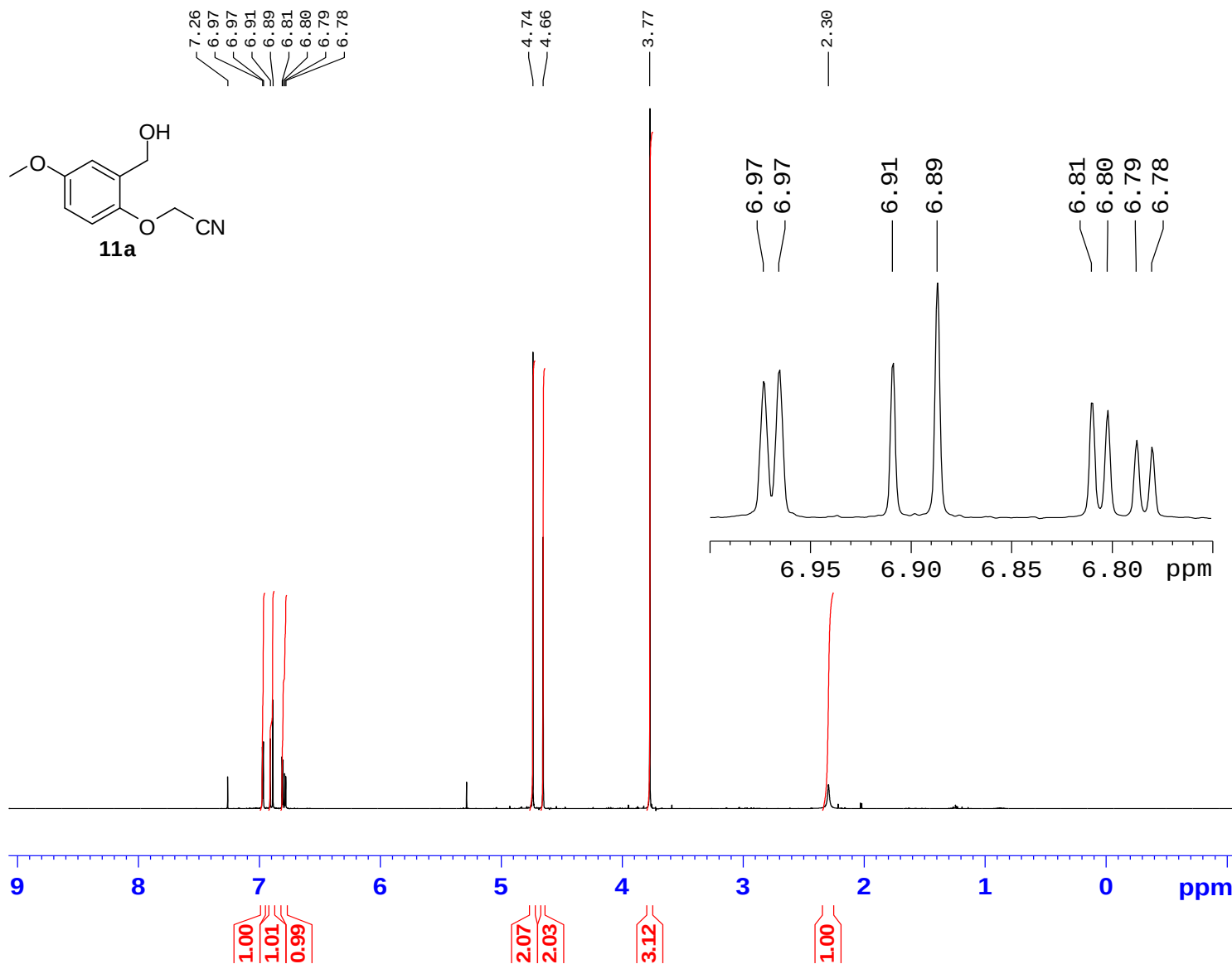


Current Data Parameters
 NAME 20120424
 EXPNO 80
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20120424
 Time 18.12
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.125483 Hz
 AQ 3.9846387 sec
 RG 114
 DW 60.800 usec
 DE 10.00 usec
 TE 295.4 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 10.50 usec
 PL1 -6.00 dB
 SF01 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300091 MHz
 WDW EM
 SSB 0
 LB 0.00 Hz
 GB 0
 PC 1.00



BA 1171

155.67

148.24

132.02

115.53

115.03

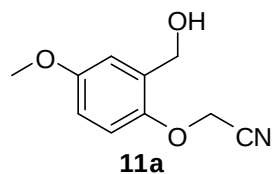
114.30

113.34

60.61

55.79

55.15



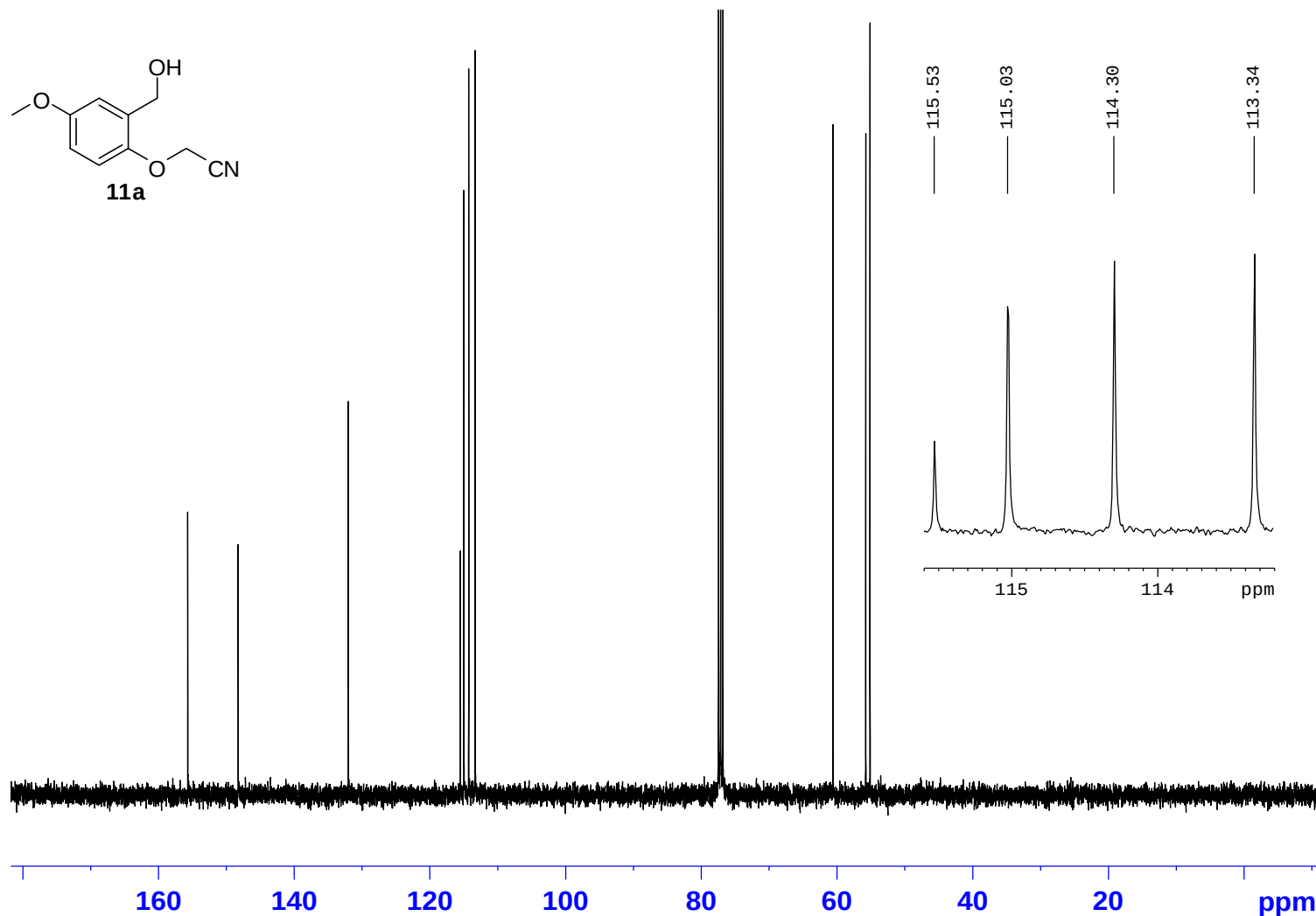
Current Data Parameters
NAME 20120424
EXPNO 140
PROCNO 1

F2 - Acquisition Parameters
Date_ 20120424
Time 21.45
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 128
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 29193
DW 19.100 usec
DE 10.00 usec
TE 300.0 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

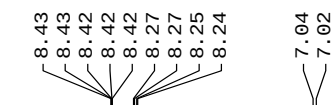
===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

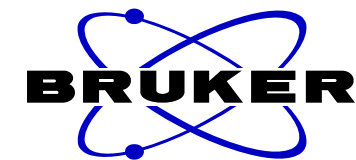
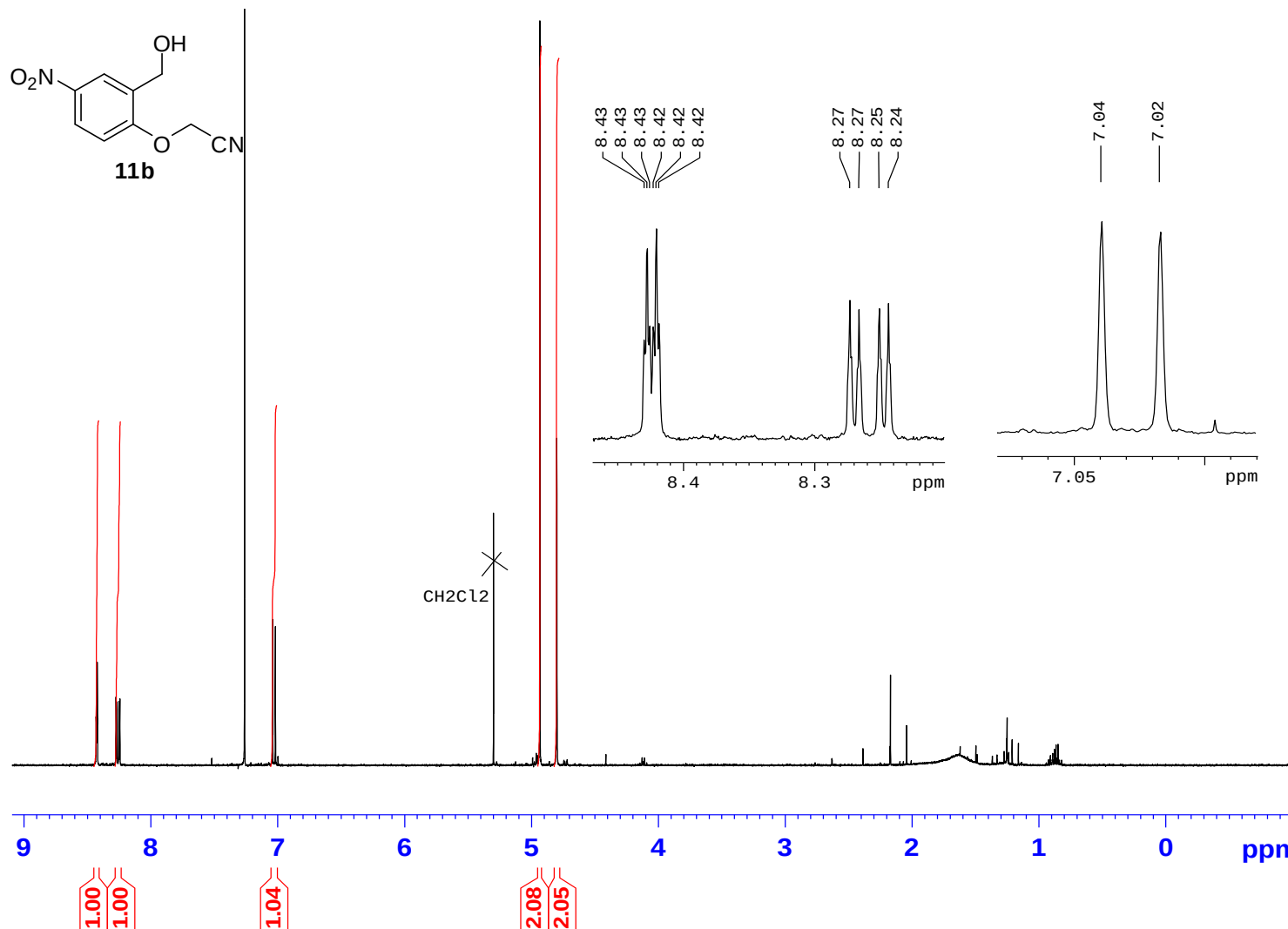
F2 - Processing parameters
SI 32768
SF 100.6127623 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



BA 1154



11b



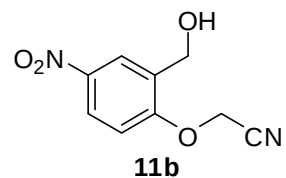
Current Data Parameters
NAME 20120419
EXPNO 30
PROCNO 1

F2 - Acquisition Parameters
Date_ 20120419
Time 8.54
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 724.1
DW 60.800 usec
DE 10.00 usec
TE 295.5 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

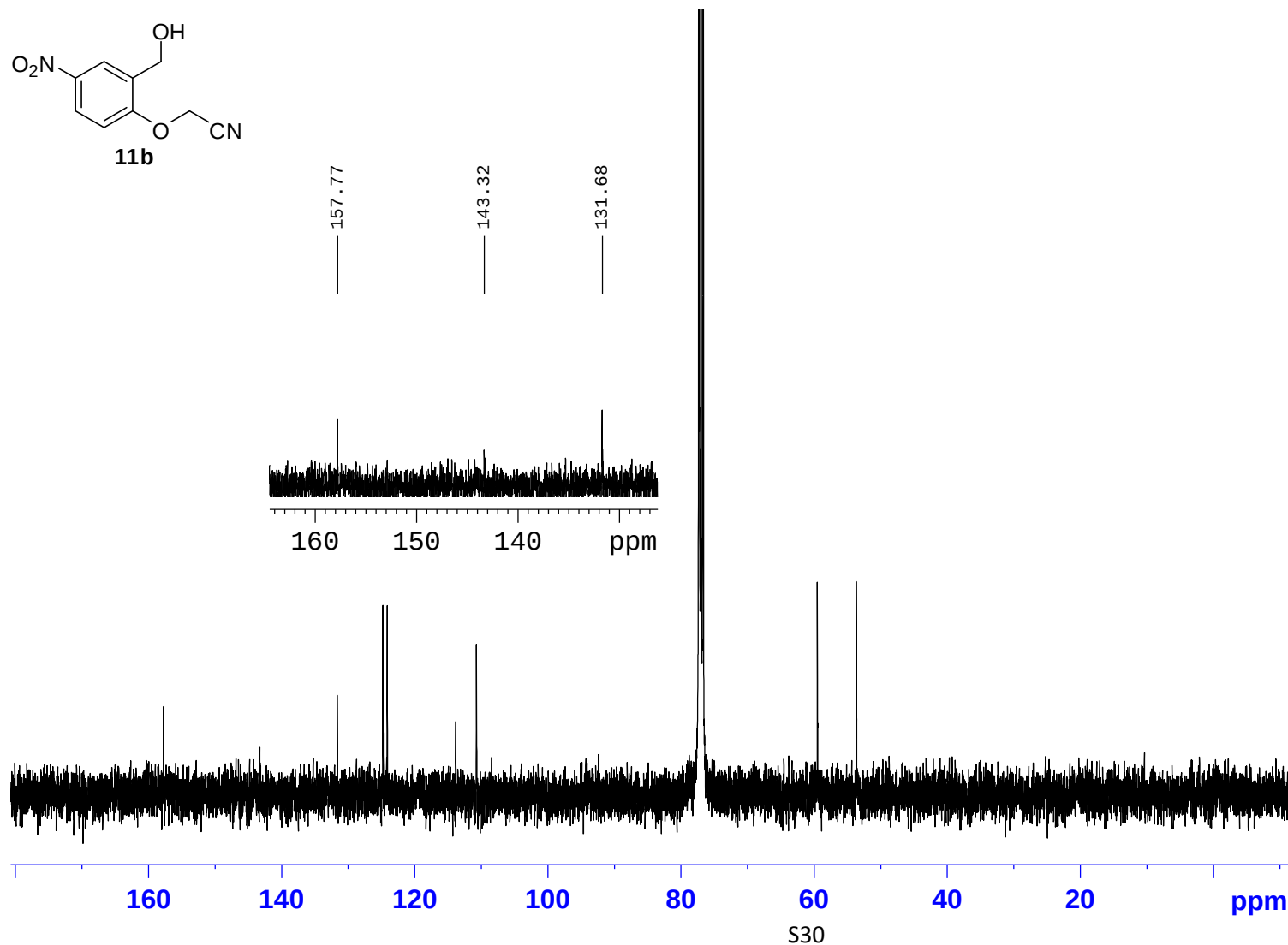
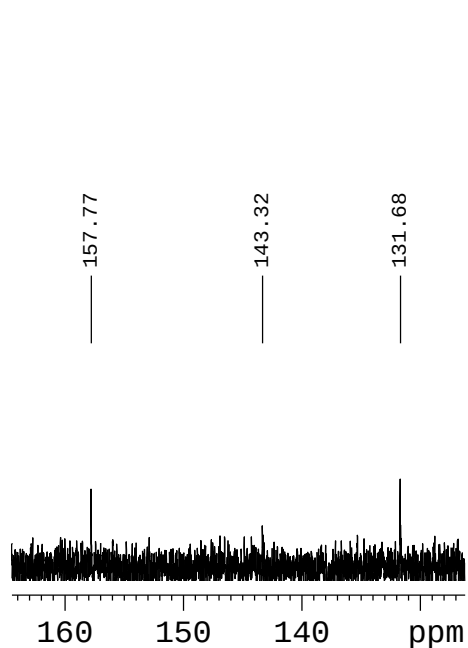
F2 - Processing parameters
SI 32768
SF 400.1300093 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00

BA 1154



157.77
143.32
131.68
124.81
124.15
113.85
110.77

59.55
53.70



Current Data Parameters
NAME 20120425
EXPNO 170
PROCNO 1

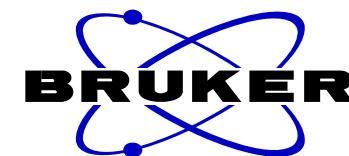
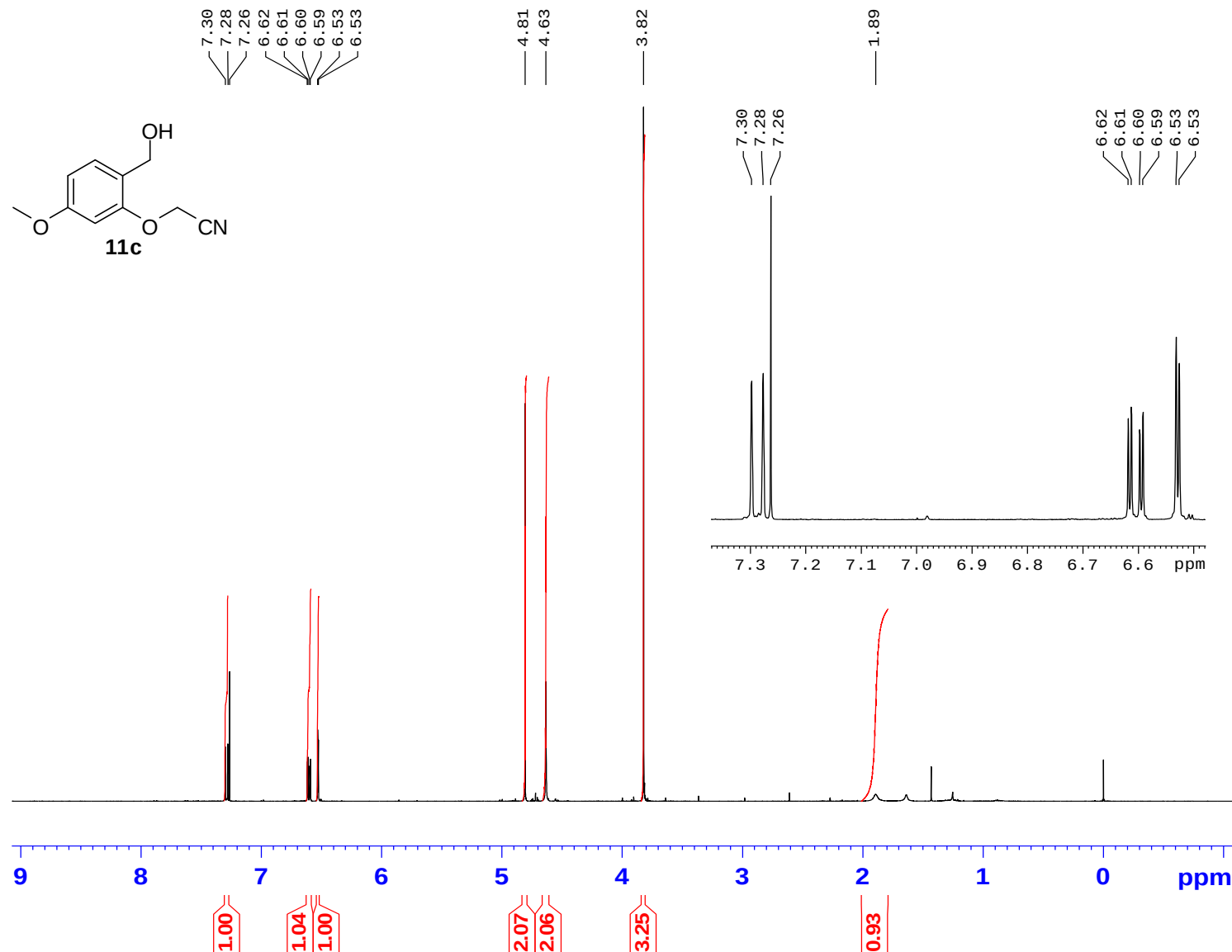
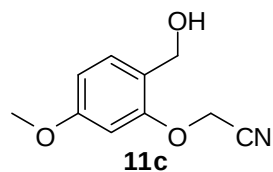
F2 - Acquisition Parameters
Date_ 20120426
Time 4.02
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 2000
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 26008
DW 19.100 usec
DE 10.00 usec
TE 296.2 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

DGP BA V740-2



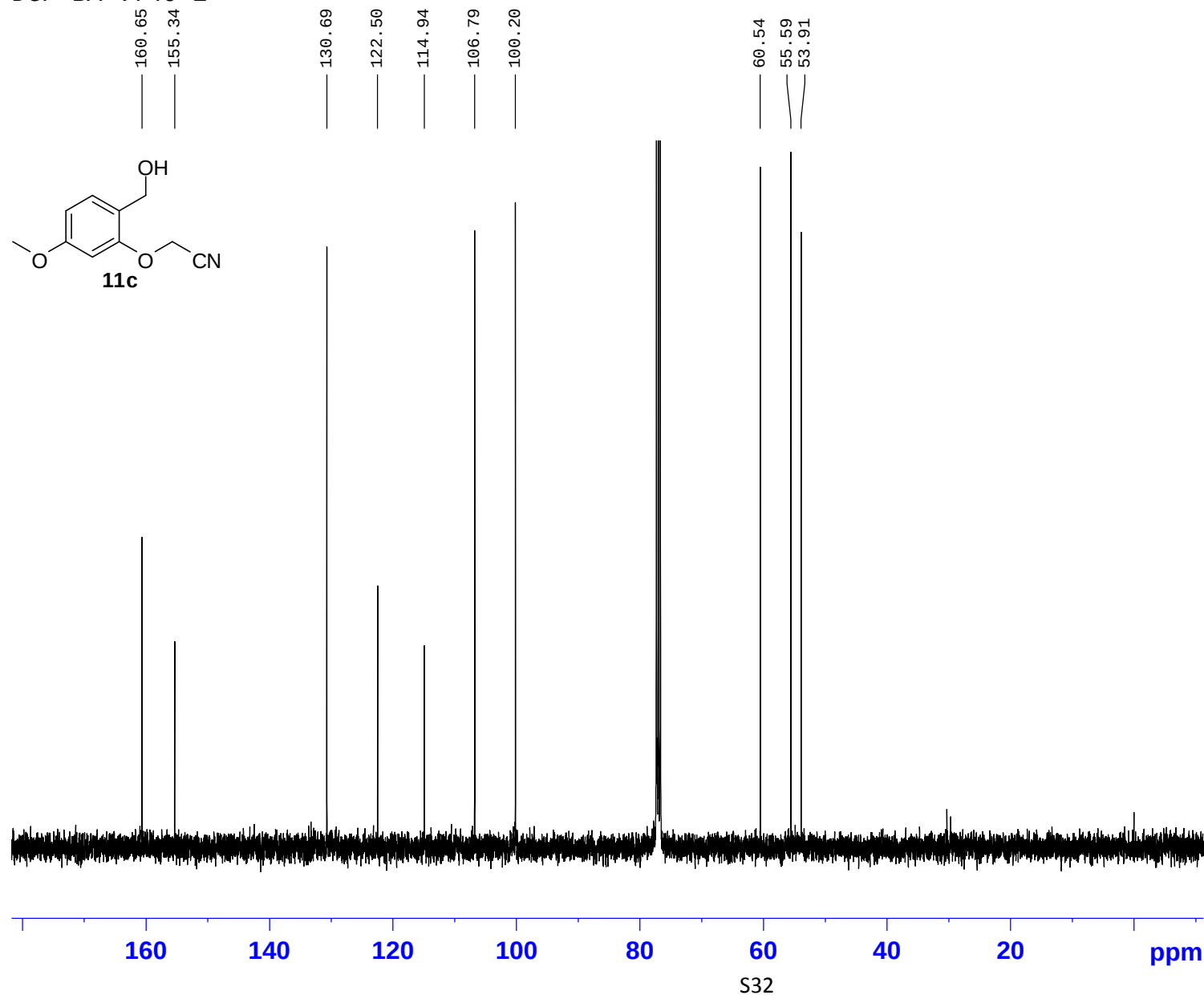
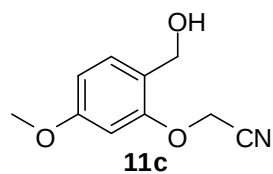
Current Data Parameters
 NAME 20140207
 EXPNO 340
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20140207
 Time 15.09
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.125483 Hz
 AQ 3.9846387 sec
 RG 181
 DW 60.800 usec
 DE 10.00 usec
 TE 294.7 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 10.50 usec
 PL1 -6.00 dB
 SF01 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300081 MHz
 WDW EM
 SSB 0
 LB 0.00 Hz
 GB 0
 PC 1.00

DGP BA V740-2



Current Data Parameters
 NAME 20140207
 EXPNO 720
 PROCNO 1

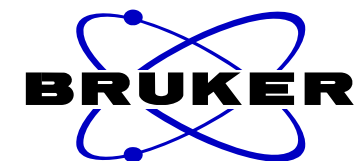
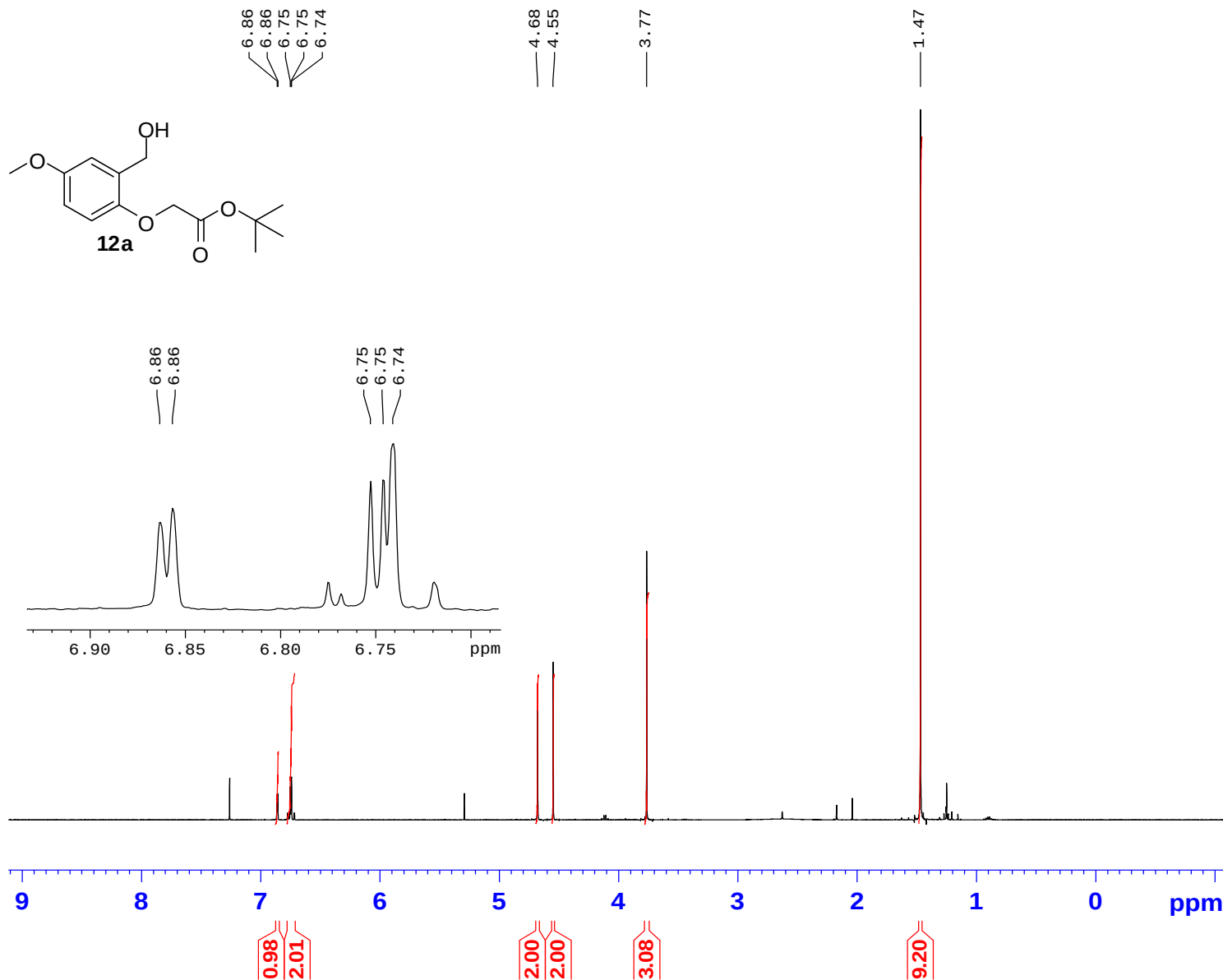
F2 - Acquisition Parameters
 Date_ 20140208
 Time 14.33
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 512
 DS 4
 SWH 26178.010 Hz
 FIDRES 0.399445 Hz
 AQ 1.2517875 sec
 RG 26008
 DW 19.100 usec
 DE 10.00 usec
 TE 295.6 K
 D1 2.00000000 sec
 d11 0.03000000 sec
 DELTA 1.89999998 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 13C
 P1 6.50 usec
 PL1 -4.00 dB
 SF01 100.6228292 MHz

===== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PL2 -4.00 dB
 PL12 11.78 dB
 PL13 18.75 dB
 SF02 400.1316005 MHz

F2 - Processing parameters
 SI 32768
 SF 100.6127690 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

BA 1340



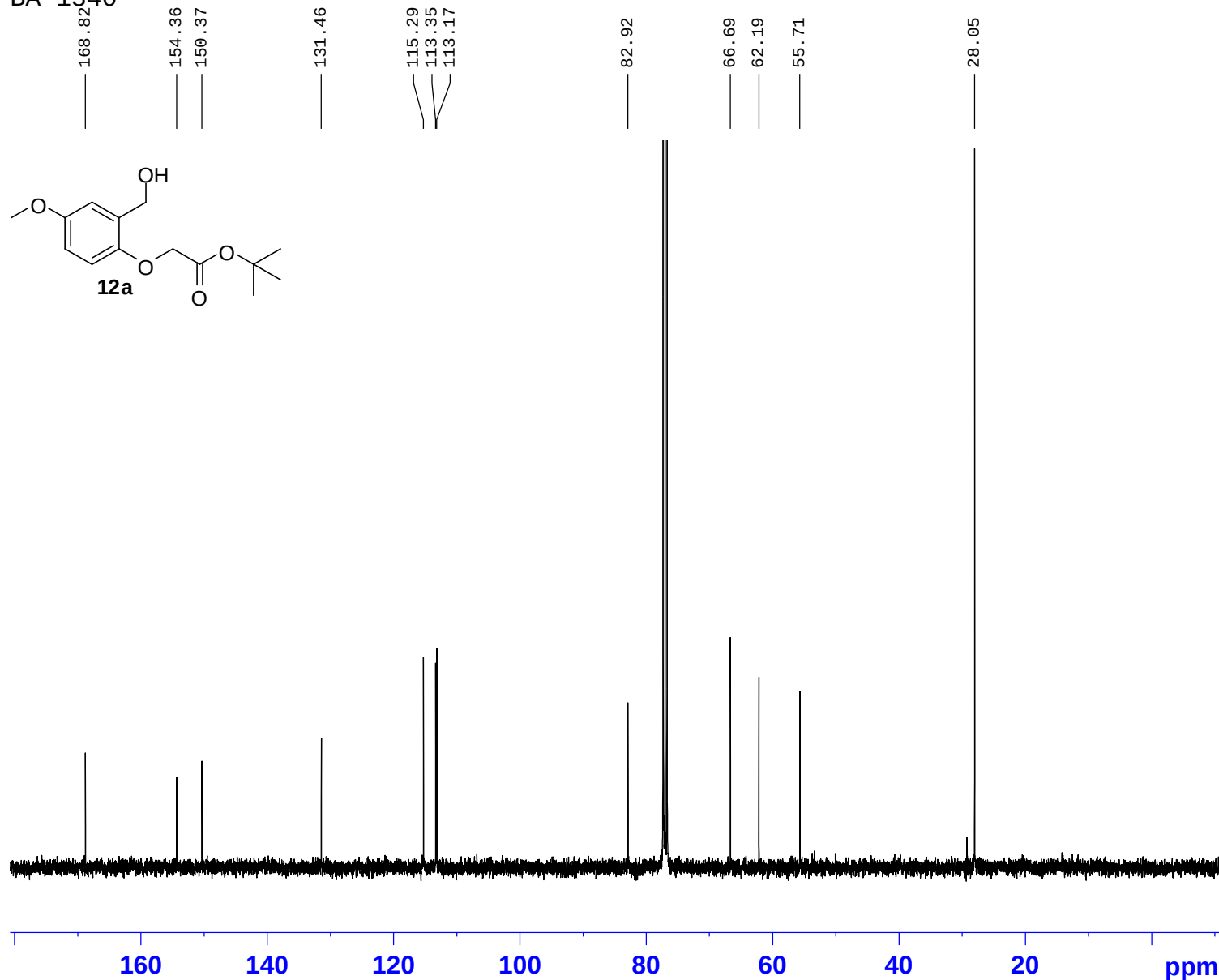
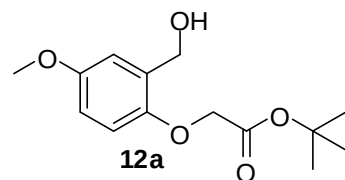
Current Data Parameters
 NAME 20121011
 EXPNO 100
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20121011
 Time 11.50
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.125483 Hz
 AQ 3.9846387 sec
 RG 181
 DW 60.800 usec
 DE 10.00 usec
 TE 295.1 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 10.50 usec
 PL1 -6.00 dB
 SF01 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300094 MHz
 WDW EM
 SSB 0
 LB 0.00 Hz
 GB 0
 PC 1.00

BA 1340



Current Data Parameters
NAME 20121011
EXPNO 510
PROCNO 1

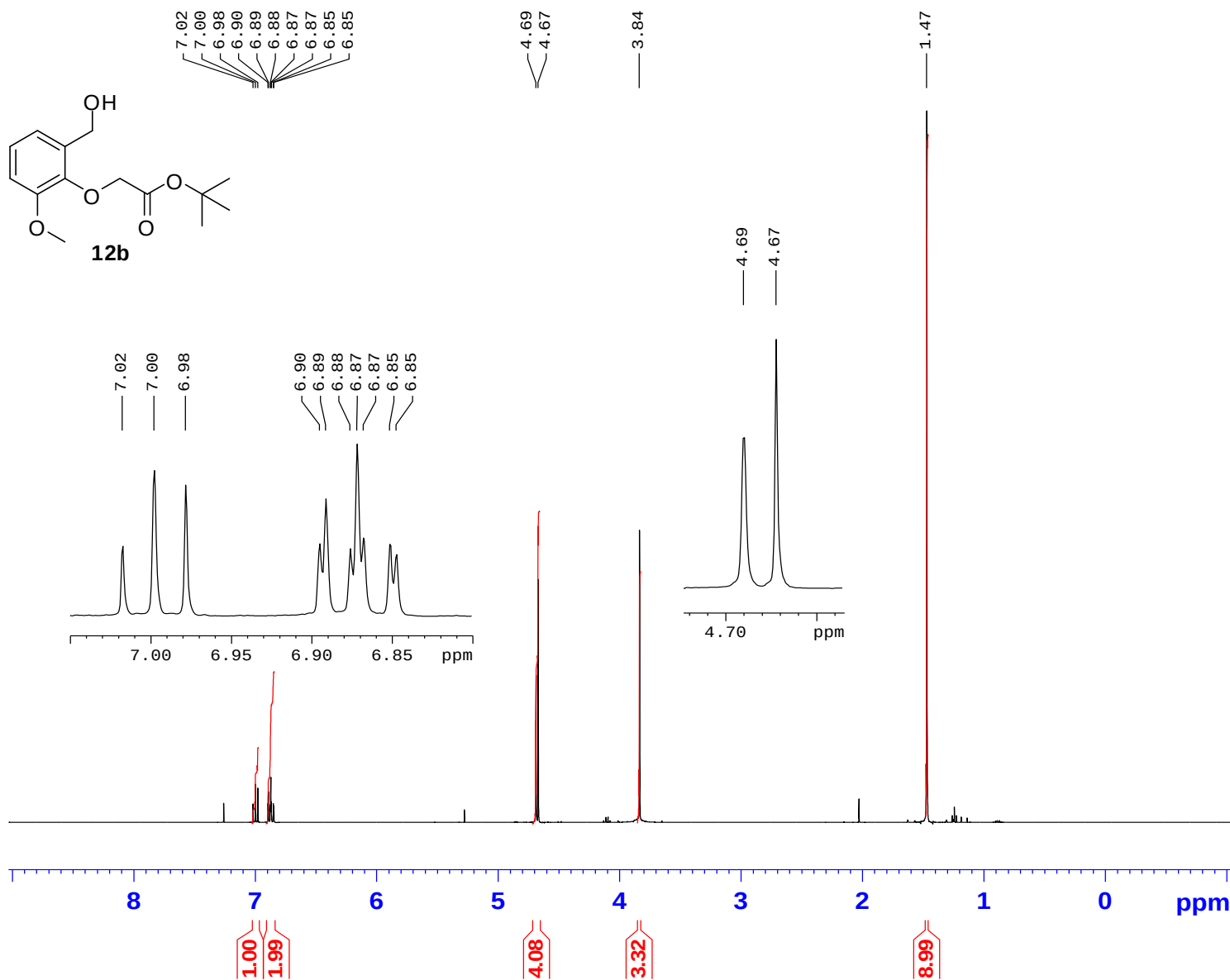
F2 - Acquisition Parameters
Date_ 20121011
Time 22.40
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 512
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 26008
DW 19.100 usec
DE 10.00 usec
TE 296.0 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

BA 1254



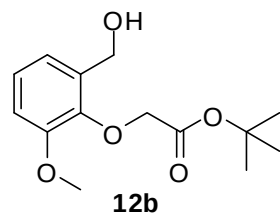
Current Data Parameters
 NAME 20120710
 EXPNO 210
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20120710
 Time 14.12
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.125483 Hz
 AQ 3.9846387 sec
 RG 80.6
 DW 60.800 usec
 DE 10.00 usec
 TE 296.2 K
 D1 1.00000000 sec
 TD0 1

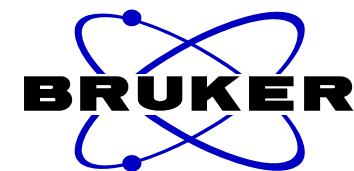
===== CHANNEL f1 =====
 NUC1 1H
 P1 10.50 usec
 PL1 -6.00 dB
 SF01 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300093 MHz
 WDW EM
 SSB 0
 LB 0.00 Hz
 GB 0
 PC 1.00

BA 1254



170.51
151.20
146.12
134.47
123.95
121.86
112.44
82.69
69.79
61.70
55.85
28.07



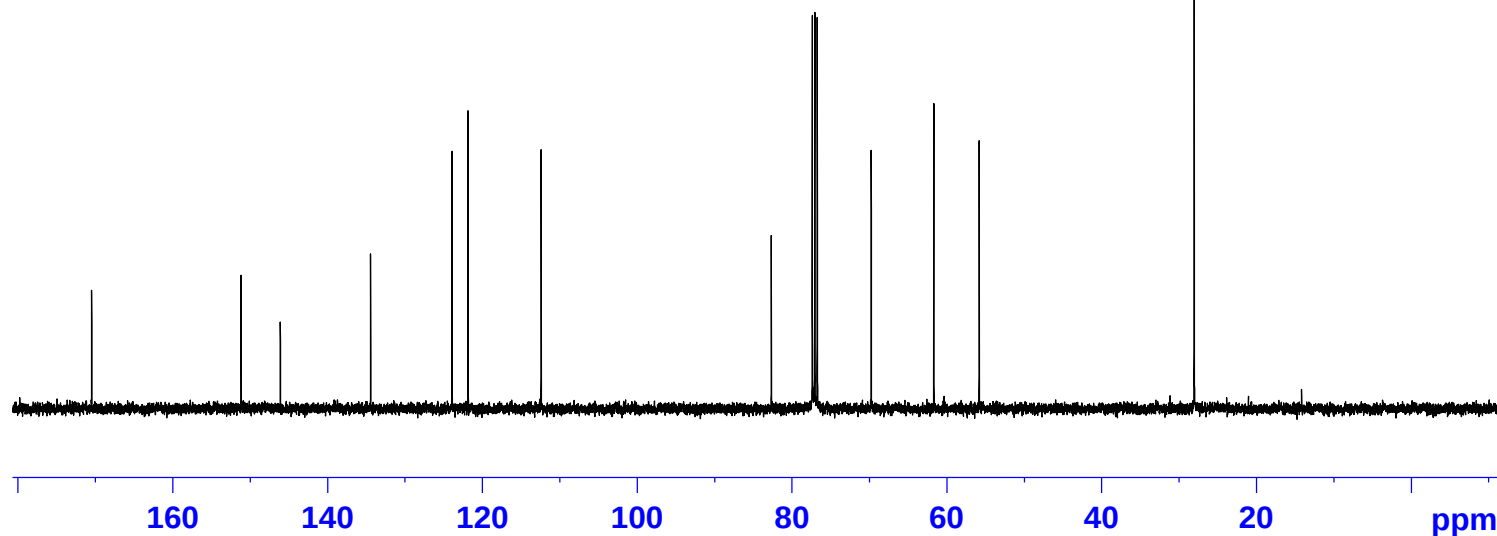
Current Data Parameters
NAME 20120710
EXPNO 520
PROCNO 1

F2 - Acquisition Parameters
Date_ 20120710
Time 20.33
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 96
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 26008
DW 19.100 usec
DE 10.00 usec
TE 300.0 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

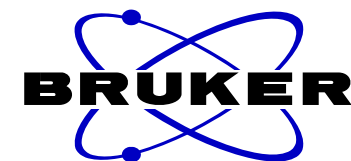
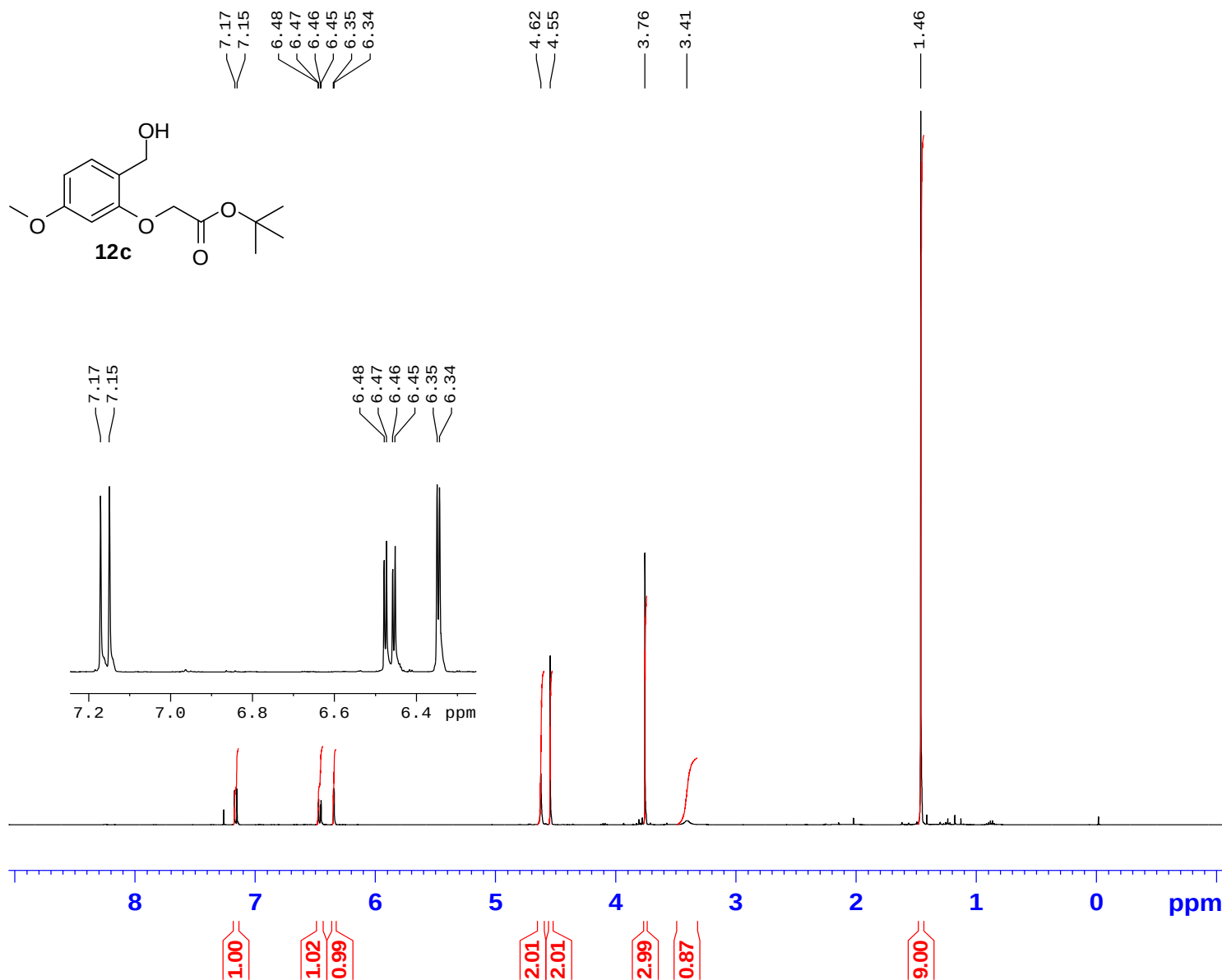
===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



DGP BAV74d-2



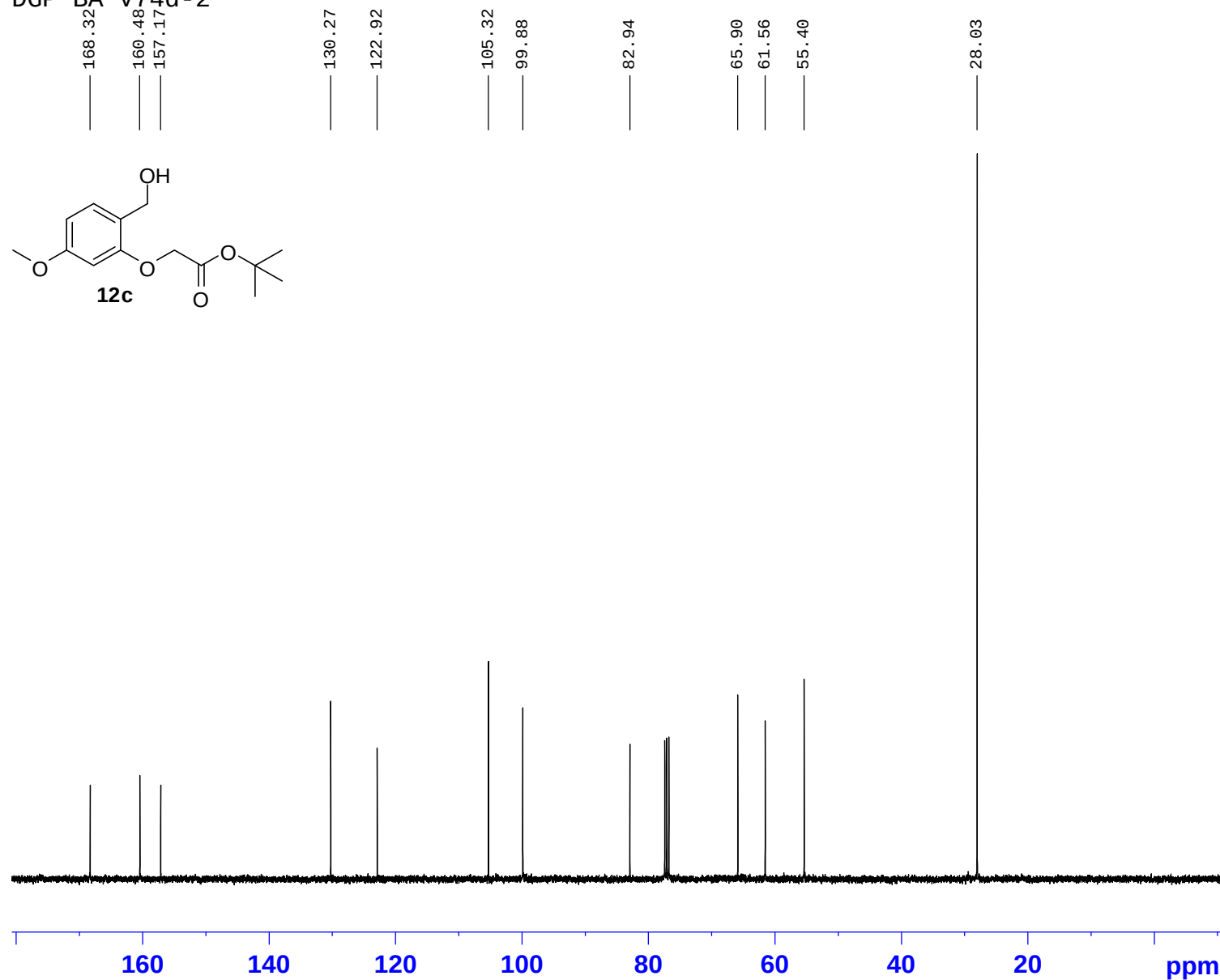
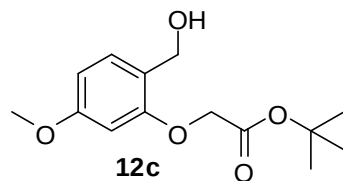
Current Data Parameters
 NAME 20140122
 EXPNO 340
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20140122
 Time 15.22
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.125483 Hz
 AQ 3.9846387 sec
 RG 64
 DW 60.800 usec
 DE 10.00 usec
 TE 294.2 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 10.50 usec
 PL1 -6.00 dB
 SF01 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300094 MHz
 WDW EM
 SSB 0
 LB 0.00 Hz
 GB 0
 PC 1.00

DGP BA V74d-2



Current Data Parameters
NAME 20140123
EXPNO 360
PROCNO 1

F2 - Acquisition Parameters
Date_ 20140123
Time 20.32
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 64
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 23170.5
DW 19.100 usec
DE 10.00 usec
TE 295.1 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

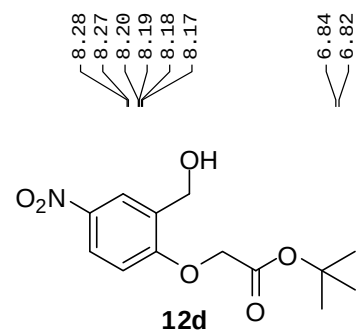
===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

S38

DGP BA 1155

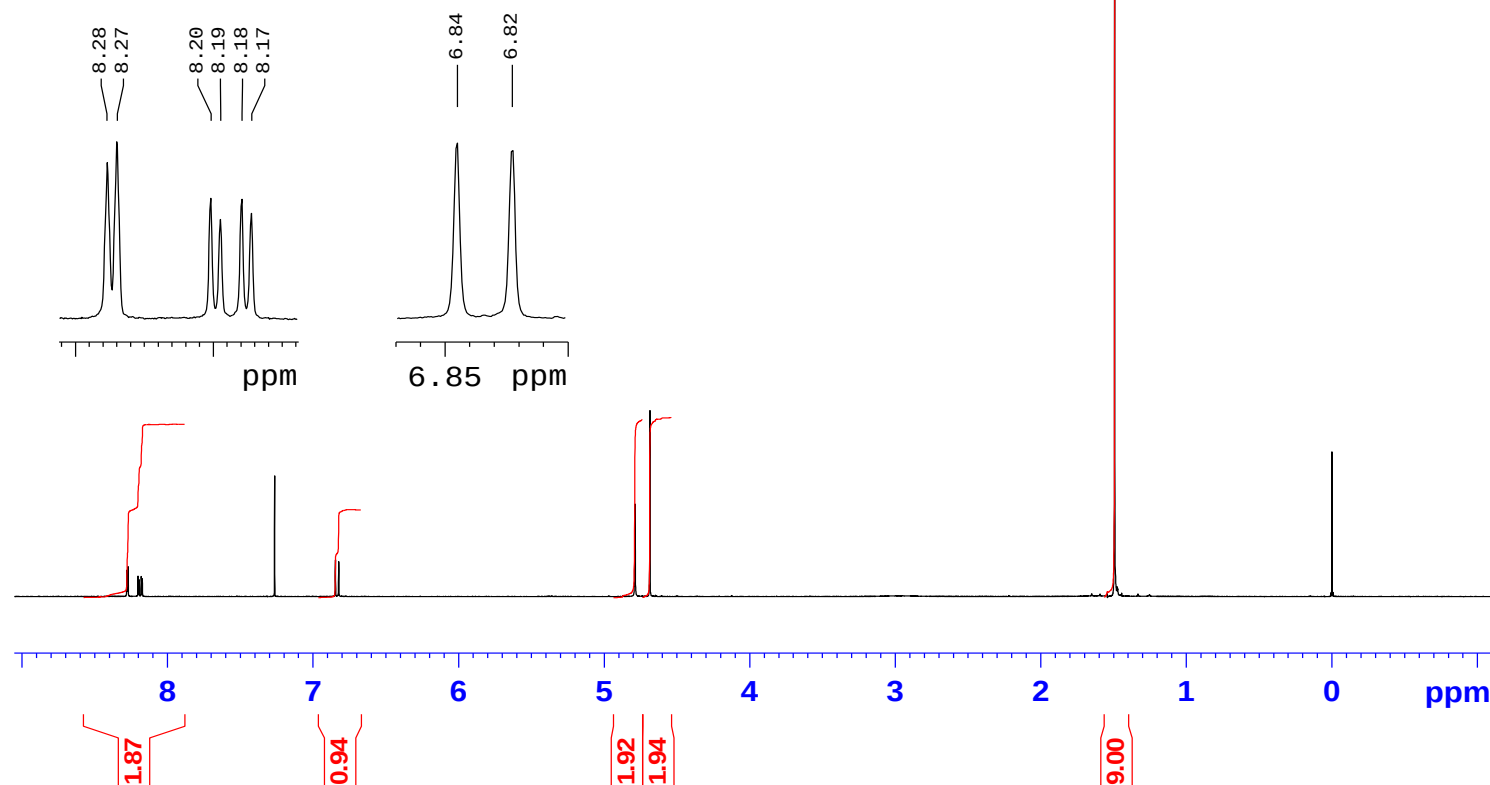


Current Data Parameters
NAME 20130627
EXPNO 180
PROCNO 1

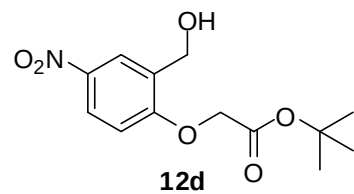
F2 - Acquisition Parameters
Date_ 20130627
Time 15.26
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 456.1
DW 60.800 usec
DE 10.00 usec
TE 295.5 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300083 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00



DGP BA 1155



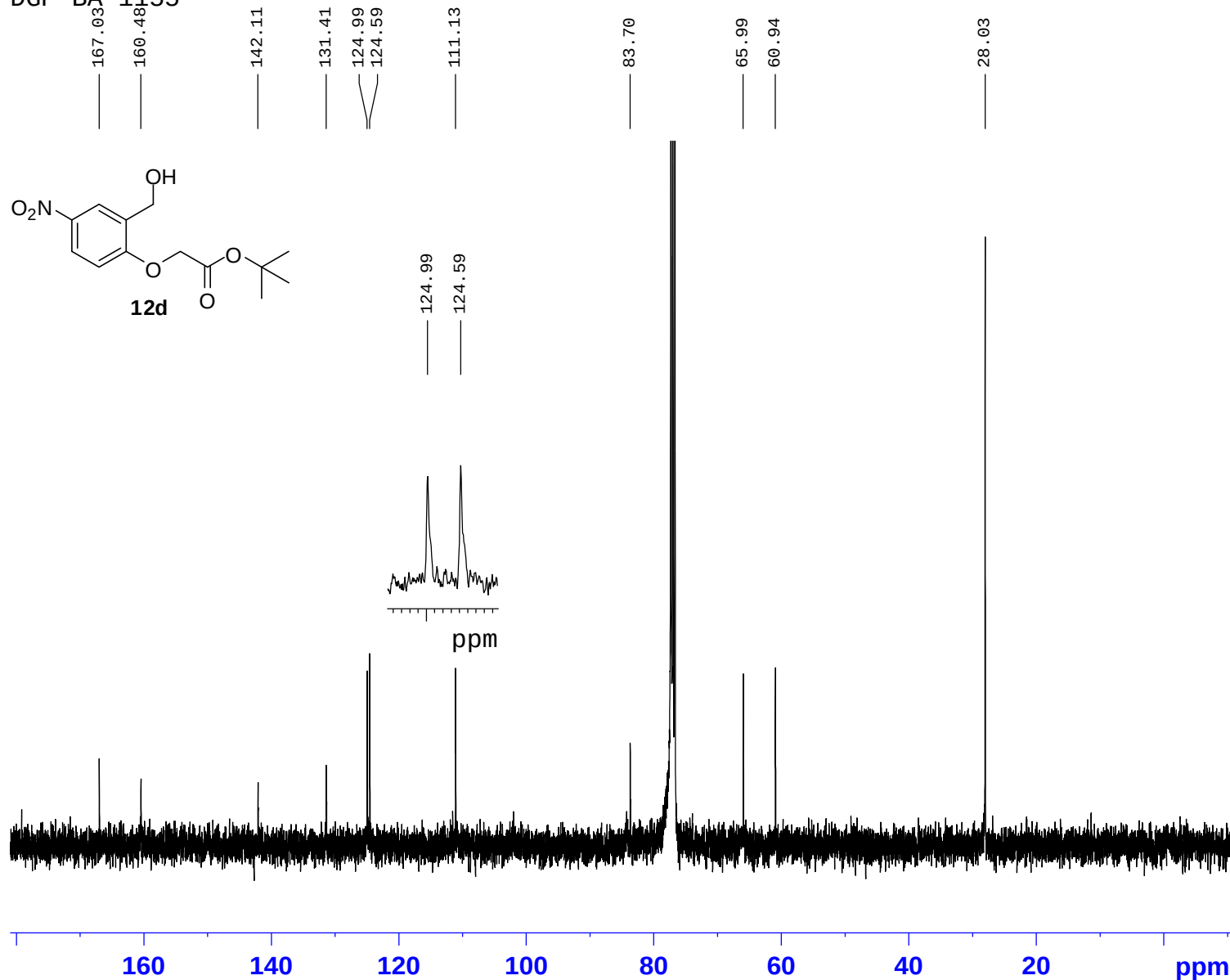
Current Data Parameters
 NAME 20131129
 EXPNO 680
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20131201
 Time 2.13
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 1200
 DS 4
 SWH 26178.010 Hz
 FIDRES 0.399445 Hz
 AQ 1.2517875 sec
 RG 26008
 DW 19.100 usec
 DE 10.00 usec
 TE 297.0 K
 D1 2.00000000 sec
 d11 0.03000000 sec
 DELTA 1.89999998 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 13C
 P1 6.50 usec
 PL1 -4.00 dB
 SF01 100.6228292 MHz

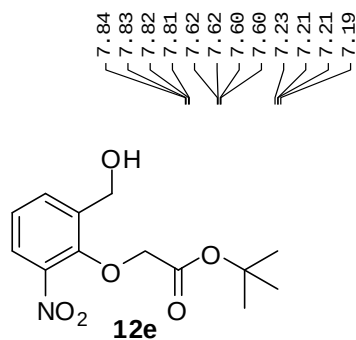
===== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PL2 -4.00 dB
 PL12 11.78 dB
 PL13 18.75 dB
 SF02 400.1316005 MHz

F2 - Processing parameters
 SI 32768
 SF 100.6127690 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

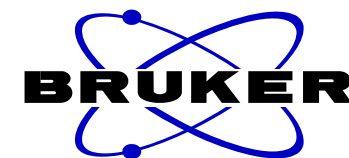


S40

DGP BA 1249



4.78
4.52

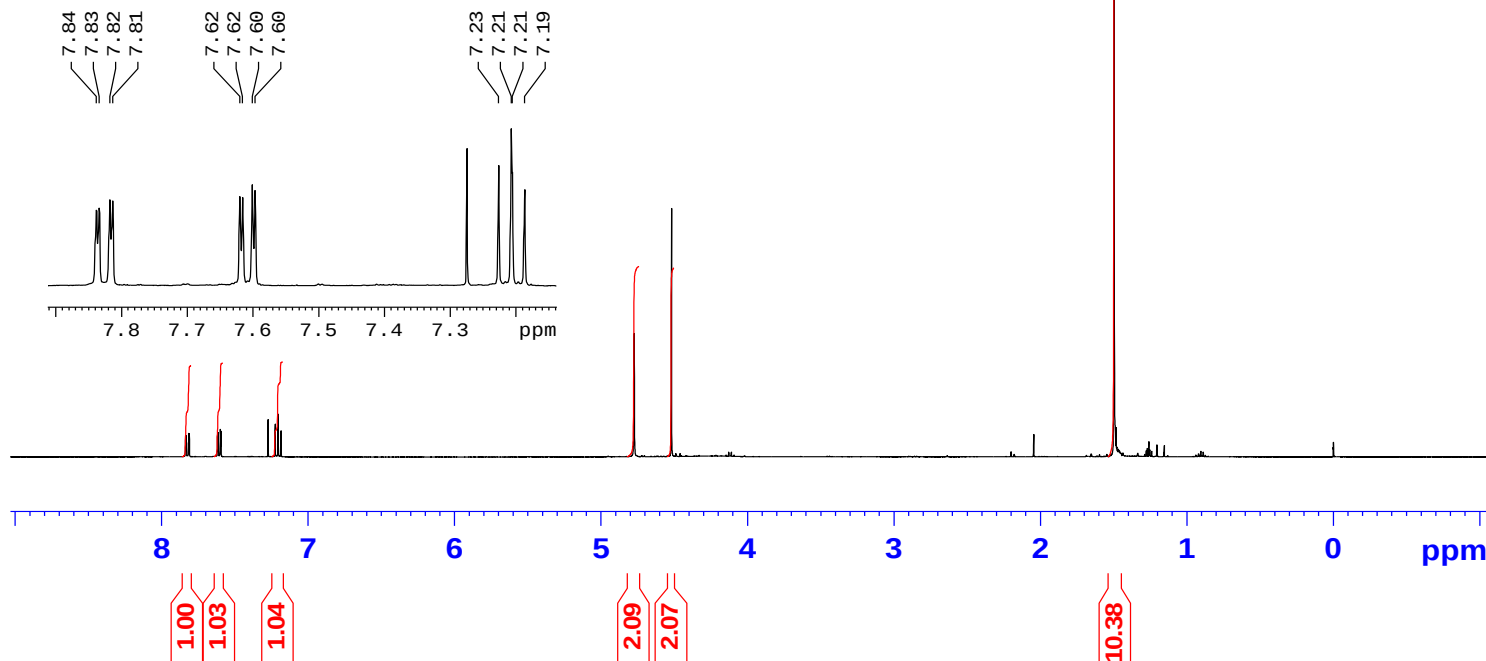


Current Data Parameters
NAME 20131113
EXPNO 80
PROCNO 1

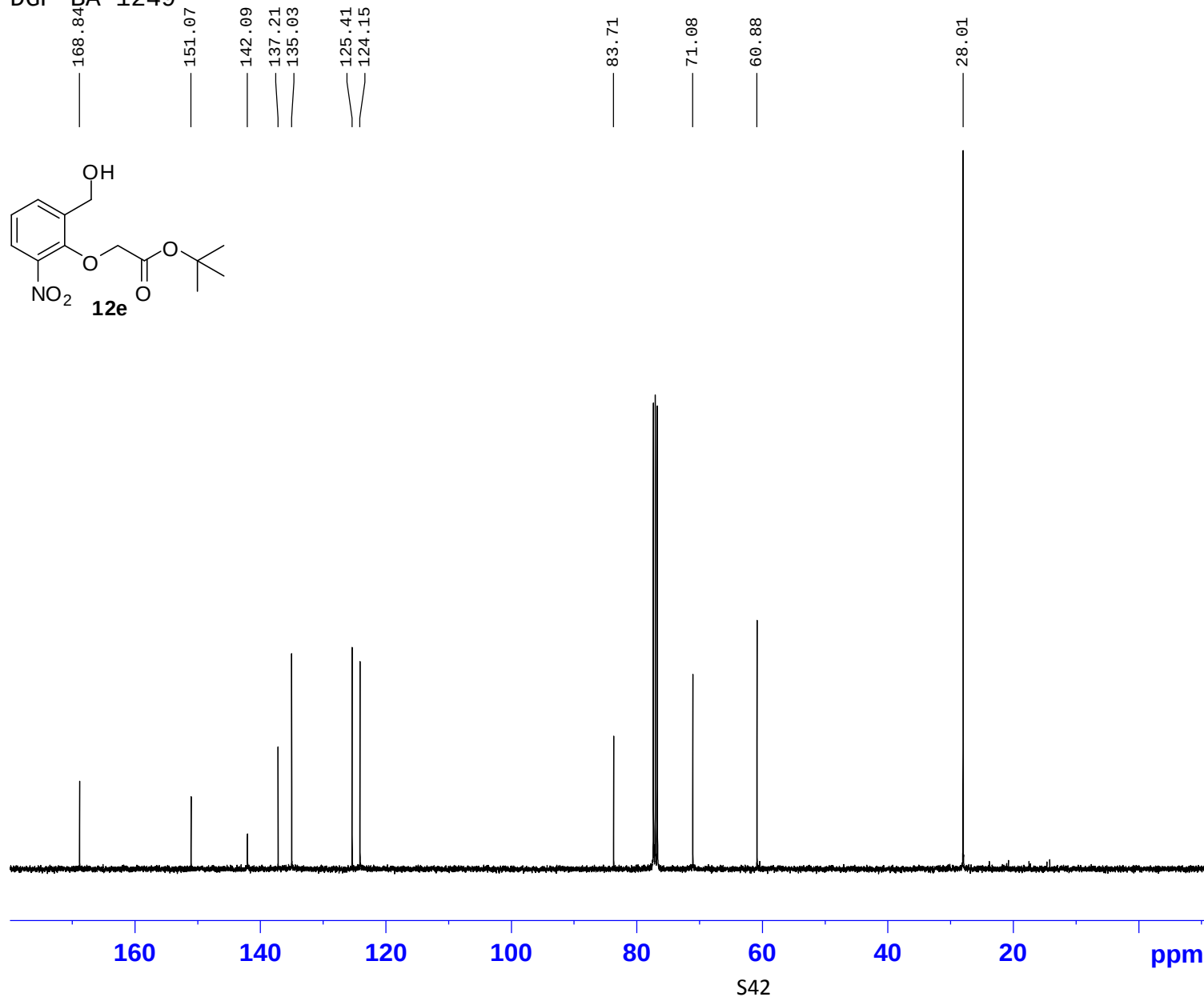
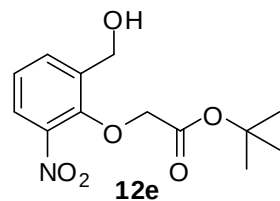
F2 - Acquisition Parameters
Date_ 20131113
Time 11.02
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 181
DW 60.800 usec
DE 10.00 usec
TE 294.6 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300034 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00



DGP BA 1249



Current Data Parameters
 NAME 20131115
 EXPNO 610
 PROCNO 1

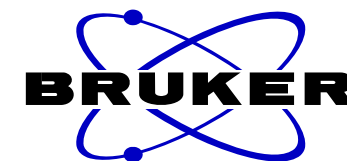
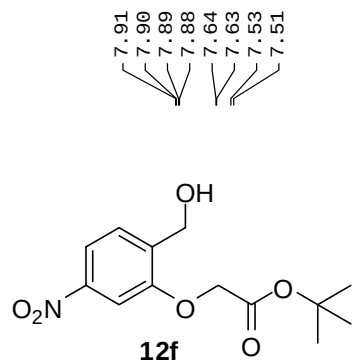
F2 - Acquisition Parameters
 Date_ 20131117
 Time 9.11
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 512
 DS 4
 SWH 26178.010 Hz
 FIDRES 0.399445 Hz
 AQ 1.2517875 sec
 RG 26008
 DW 19.100 usec
 DE 10.00 usec
 TE 295.3 K
 D1 2.00000000 sec
 d11 0.03000000 sec
 DELTA 1.89999998 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 13C
 P1 6.50 usec
 PL1 -4.00 dB
 SF01 100.6228292 MHz

===== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PL2 -4.00 dB
 PL12 11.78 dB
 PL13 18.75 dB
 SF02 400.1316005 MHz

F2 - Processing parameters
 SI 32768
 SF 100.6127690 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

DGP BA 1248

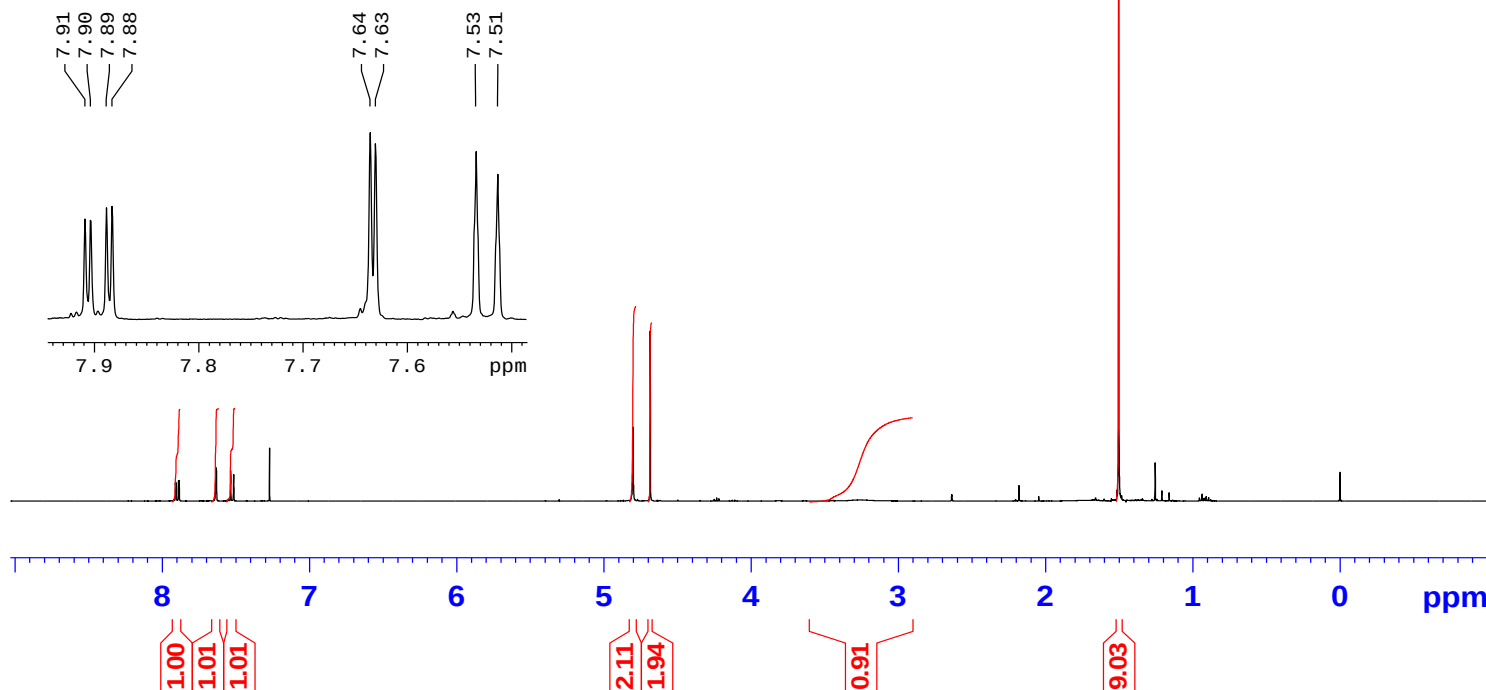


Current Data Parameters
 NAME 20131113
 EXPNO 140
 PROCNO 1

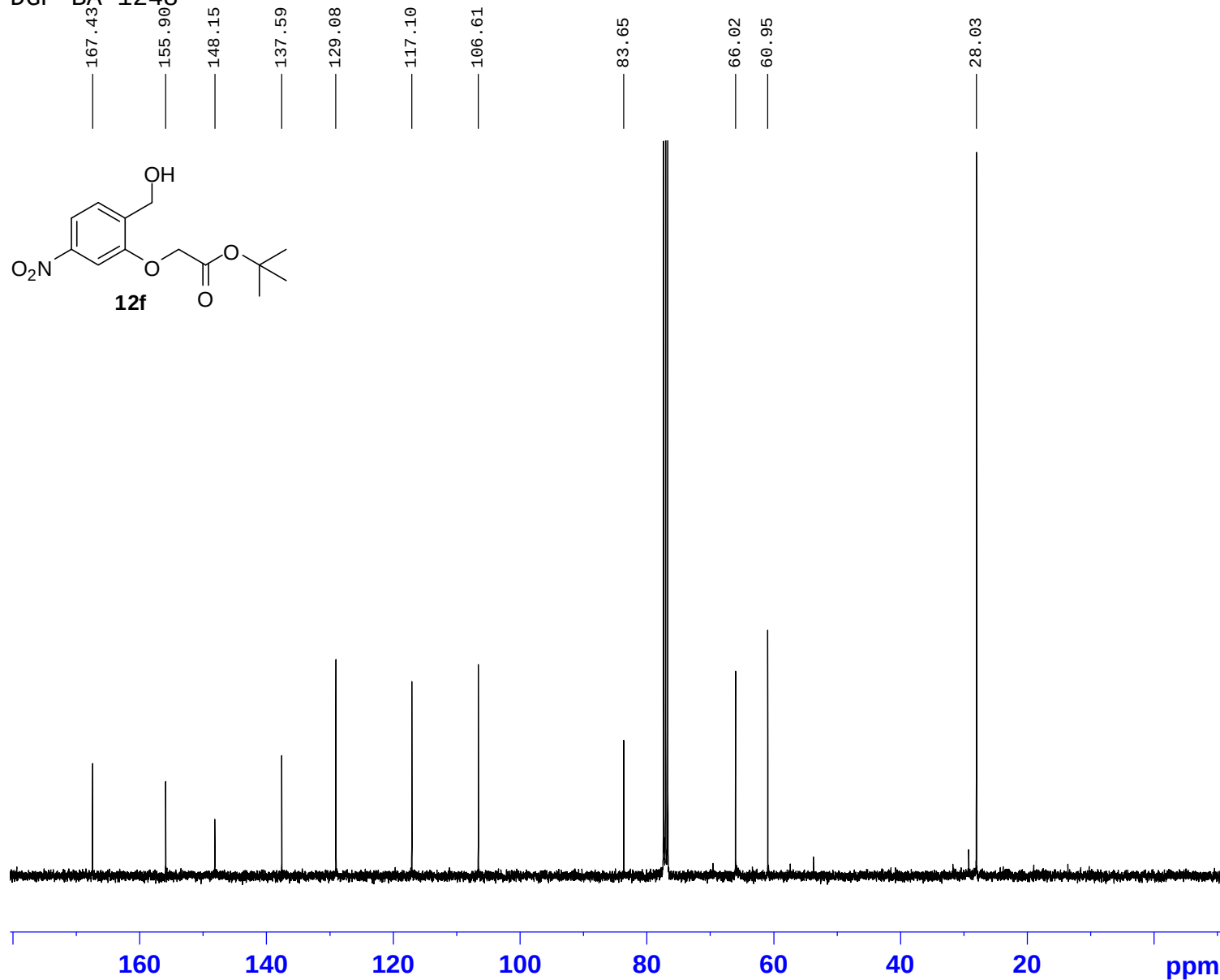
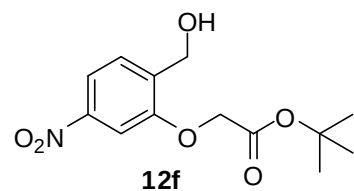
F2 - Acquisition Parameters
 Date_ 20131113
 Time 11.49
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.125483 Hz
 AQ 3.9846387 sec
 RG 181
 DW 60.800 usec
 DE 10.00 usec
 TE 300.0 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 10.50 usec
 PL1 -6.00 dB
 SF01 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300054 MHz
 WDW EM
 SSB 0
 LB 0.00 Hz
 GB 0
 PC 1.00



DGP BA 1248



Current Data Parameters
 NAME 20131115
 EXPNO 640
 PROCNO 1

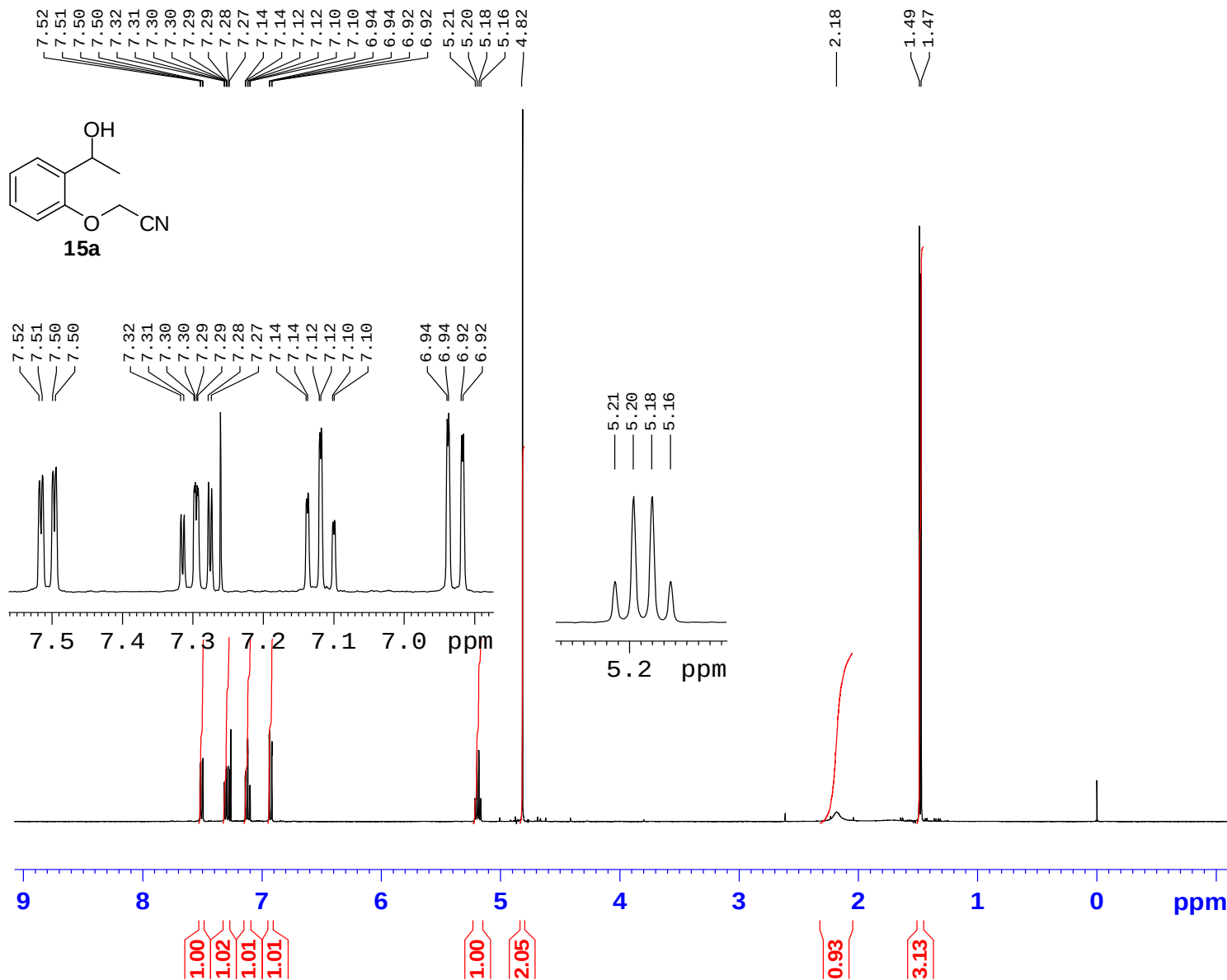
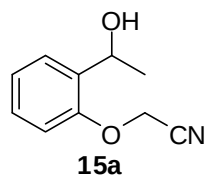
F2 - Acquisition Parameters
 Date_ 20131117
 Time 11.48
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 512
 DS 4
 SWH 26178.010 Hz
 FIDRES 0.399445 Hz
 AQ 1.2517875 sec
 RG 26008
 DW 19.100 usec
 DE 10.00 usec
 TE 300.0 K
 D1 2.00000000 sec
 d11 0.03000000 sec
 DELTA 1.89999998 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 13C
 P1 6.50 usec
 PL1 -4.00 dB
 SF01 100.6228292 MHz

===== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PL2 -4.00 dB
 PL12 11.78 dB
 PL13 18.75 dB
 SF02 400.1316005 MHz

F2 - Processing parameters
 SI 32768
 SF 100.6127690 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

DGP BA 1055



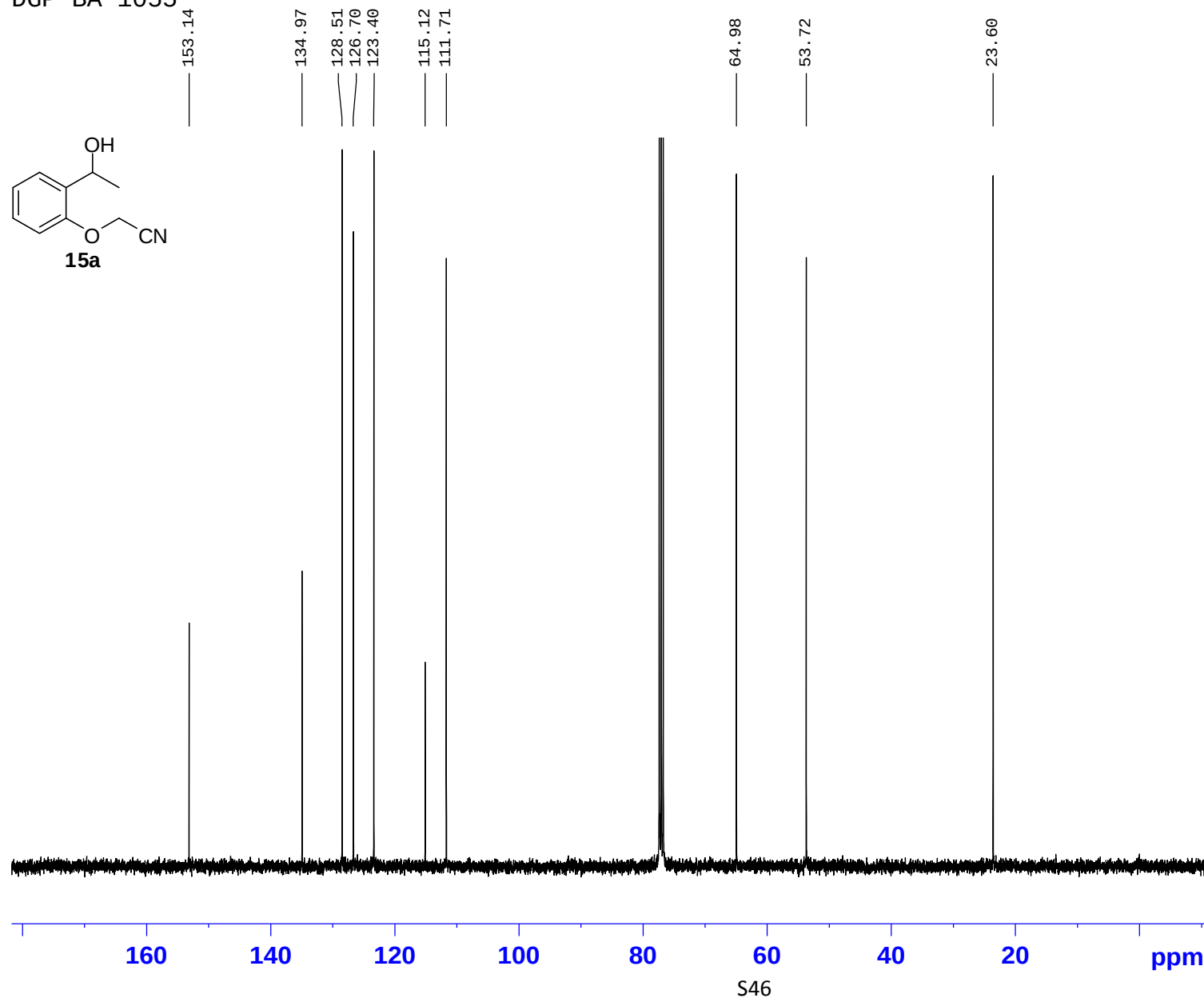
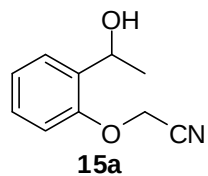
Current Data Parameters
 NAME 20131113
 EXPNO 290
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20131113
 Time 15.24
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.125483 Hz
 AQ 3.9846387 sec
 RG 181
 DW 60.800 usec
 DE 10.00 usec
 TE 294.7 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 10.50 usec
 PL1 -6.00 dB
 SF01 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300089 MHz
 WDW EM
 SSB 0
 LB 0.00 Hz
 GB 0
 PC 1.00

DGP BA 1055



Current Data Parameters
NAME 20131115
EXPNO 620
PROCNO 1

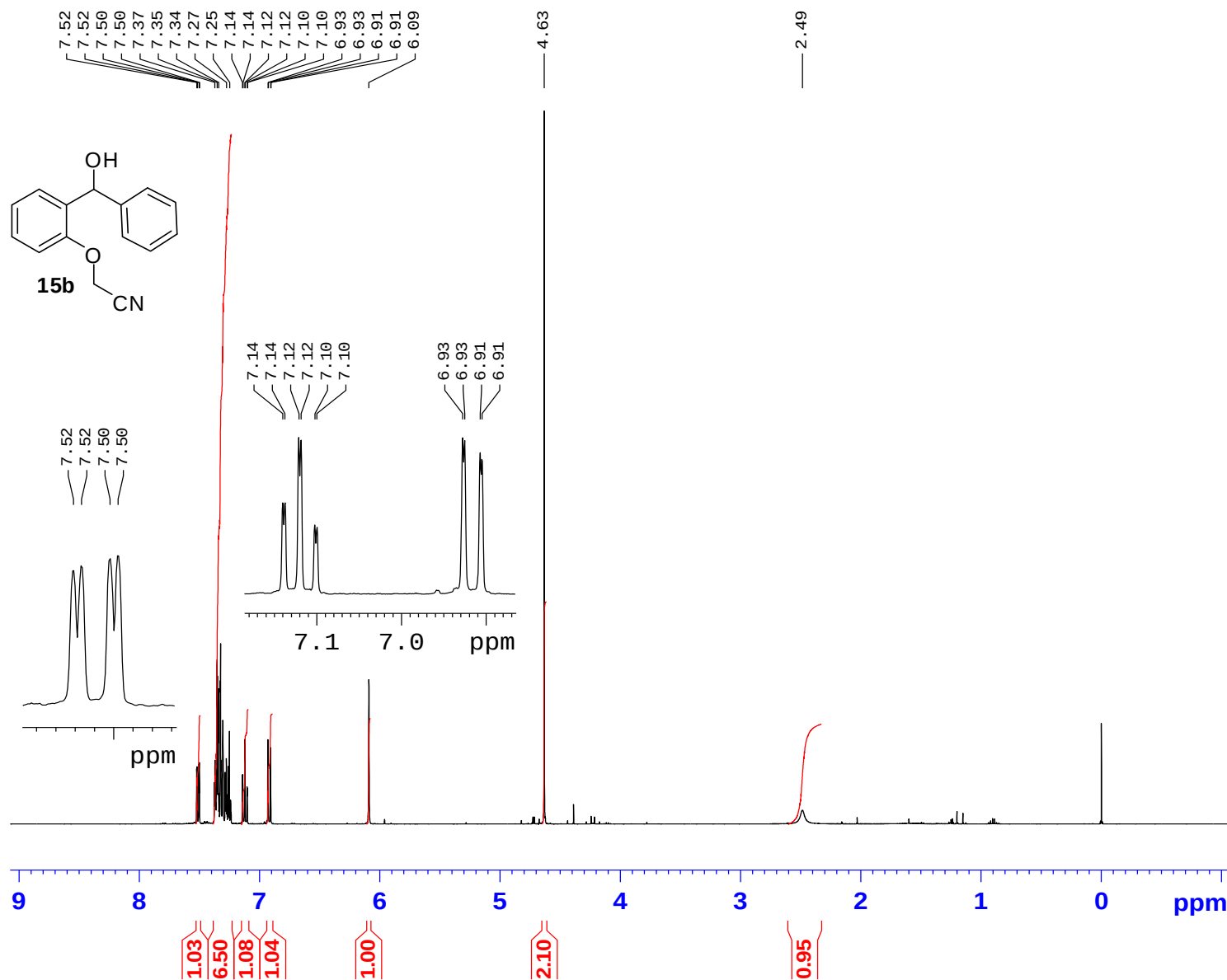
F2 - Acquisition Parameters
Date_ 20131117
Time 10.03
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 512
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 26008
DW 19.100 usec
DE 10.00 usec
TE 295.4 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

DGP BA 1058



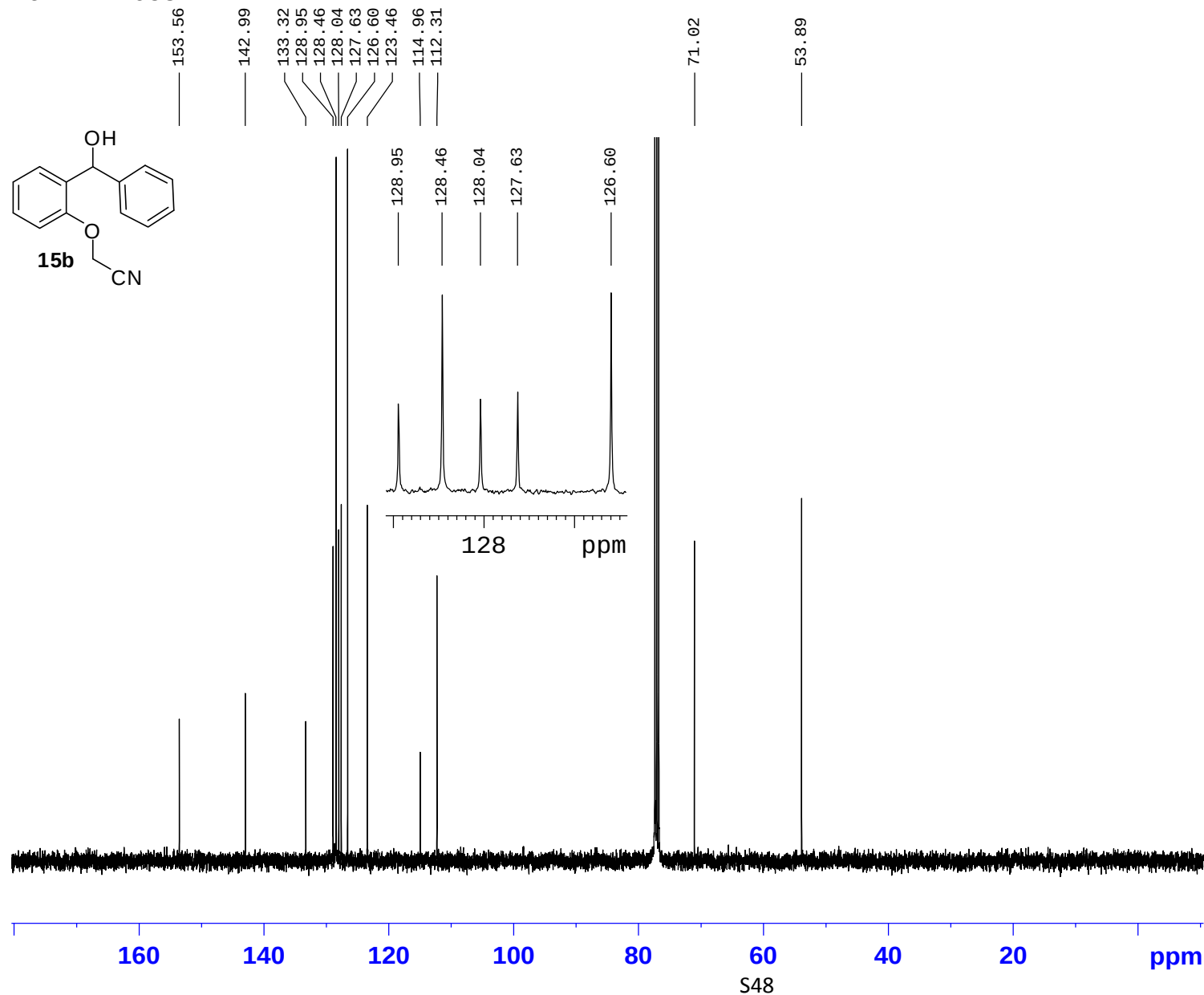
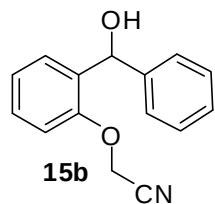
Current Data Parameters
 NAME 20130627
 EXPNO 190
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20130627
 Time 15.34
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.125483 Hz
 AQ 3.9846387 sec
 RG 181
 DW 60.800 usec
 DE 10.00 usec
 TE 295.7 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 10.50 usec
 PL1 -6.00 dB
 SF01 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300145 MHz
 WDW EM
 SSB 0
 LB 0.00 Hz
 GB 0
 PC 1.00

DGP BA 1058



Current Data Parameters
NAME 20131120
EXPNO 630
PROCNO 1

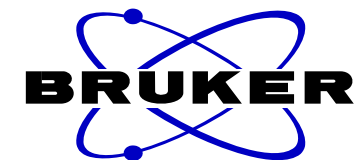
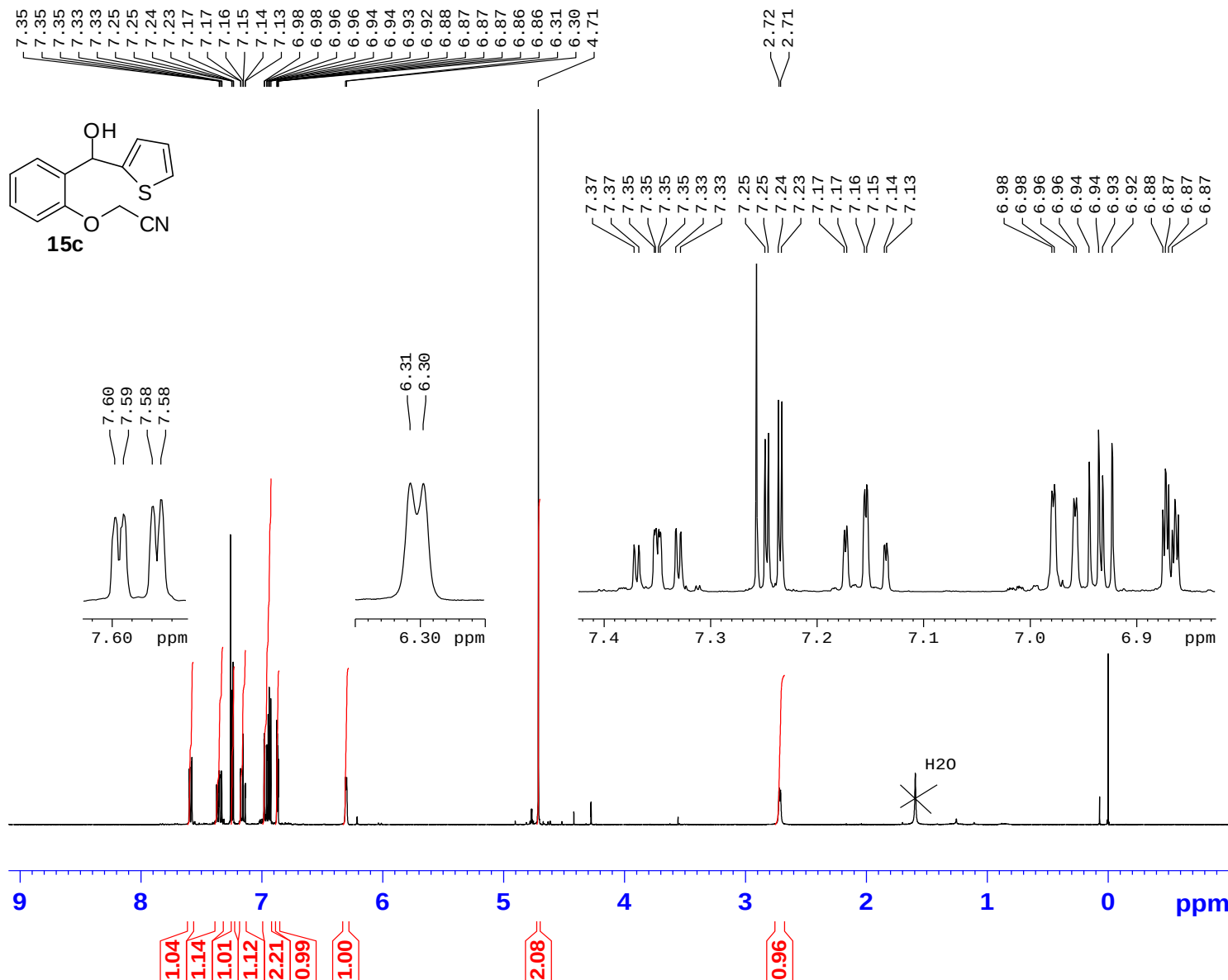
F2 - Acquisition Parameters
Date_ 20131121
Time 5.16
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 512
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 29193
DW 19.100 usec
DE 10.00 usec
TE 295.6 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

DGP BA 1127



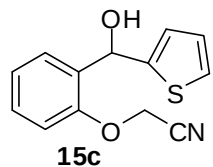
Current Data Parameters
 NAME 20131108
 EXPNO 490
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20131108
 Time 18.35
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.125483 Hz
 AQ 3.9846387 sec
 RG 287.4
 DW 60.800 usec
 DE 10.00 usec
 TE 295.3 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 10.50 usec
 PL1 -6.00 dB
 SF01 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300106 MHz
 WDW EM
 SSB 0
 LB 0.00 Hz
 GB 0
 PC 1.00

DGP BA 1127



153.43
147.33
132.67
129.33
127.81
126.73
125.21
124.72
123.53
114.92
112.30

67.46
53.85



Current Data Parameters
NAME 20131113
EXPNO 480
PROCNO 1

F2 - Acquisition Parameters

Date_ 20131114
Time 5.47
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 800
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 26008
DW 19.100 usec
DE 10.00 usec
TE 295.5 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999999 sec
TD0 1

===== CHANNEL f1 =====

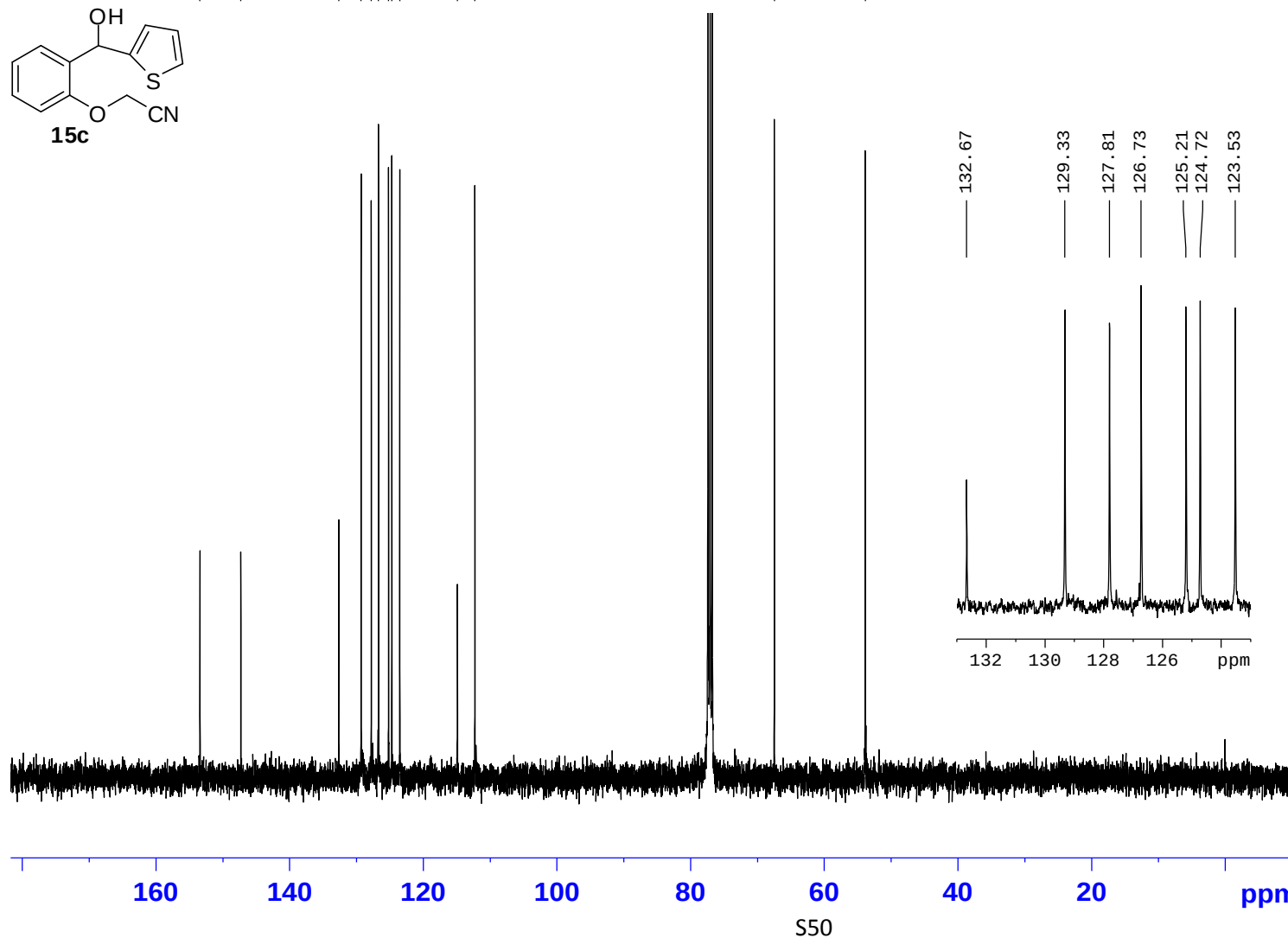
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====

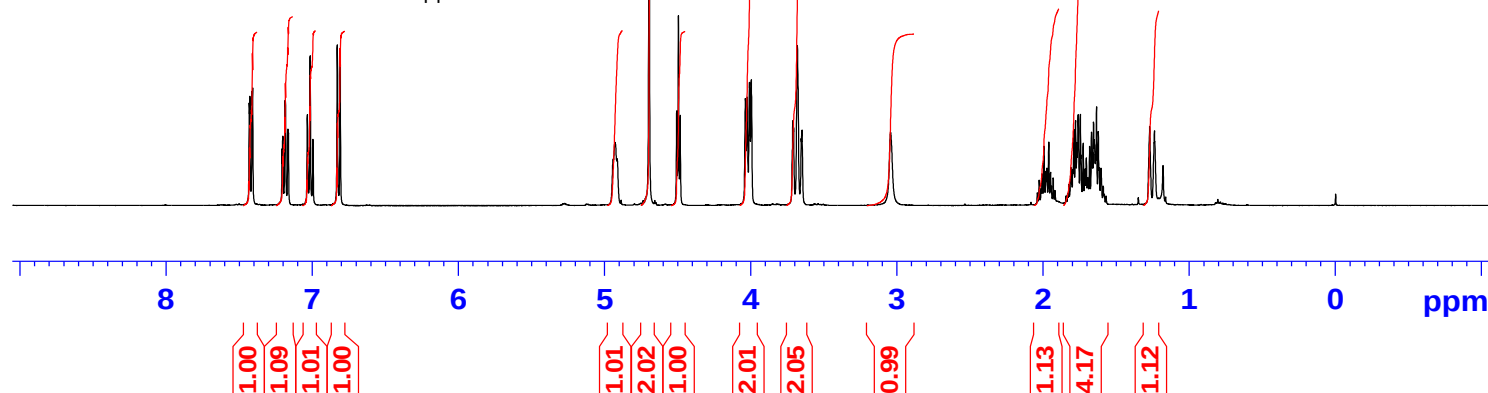
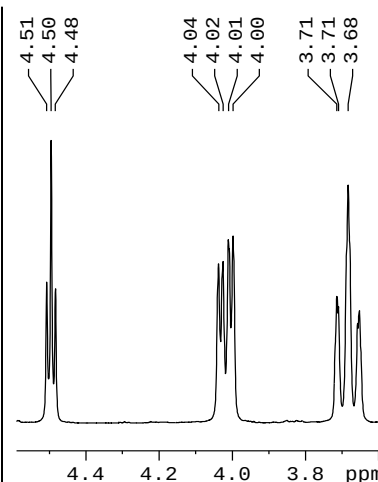
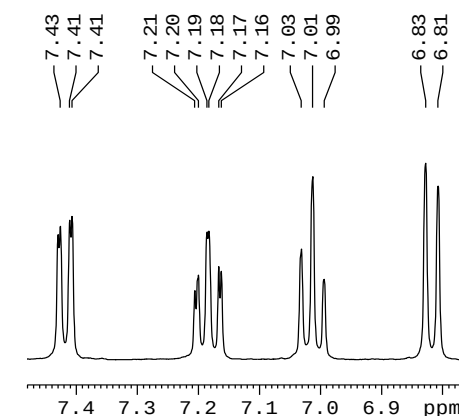
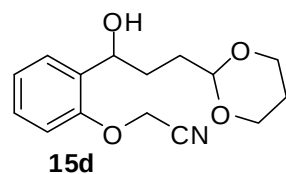
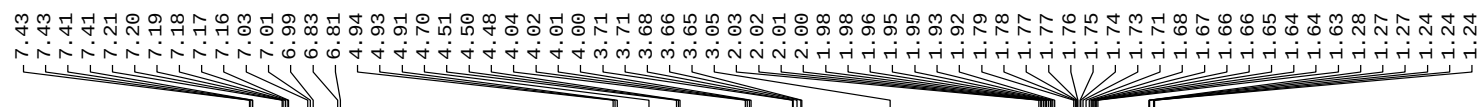
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters

SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



JF-BA1129



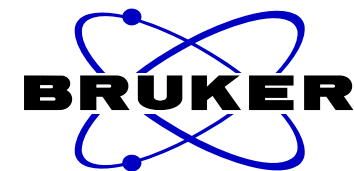
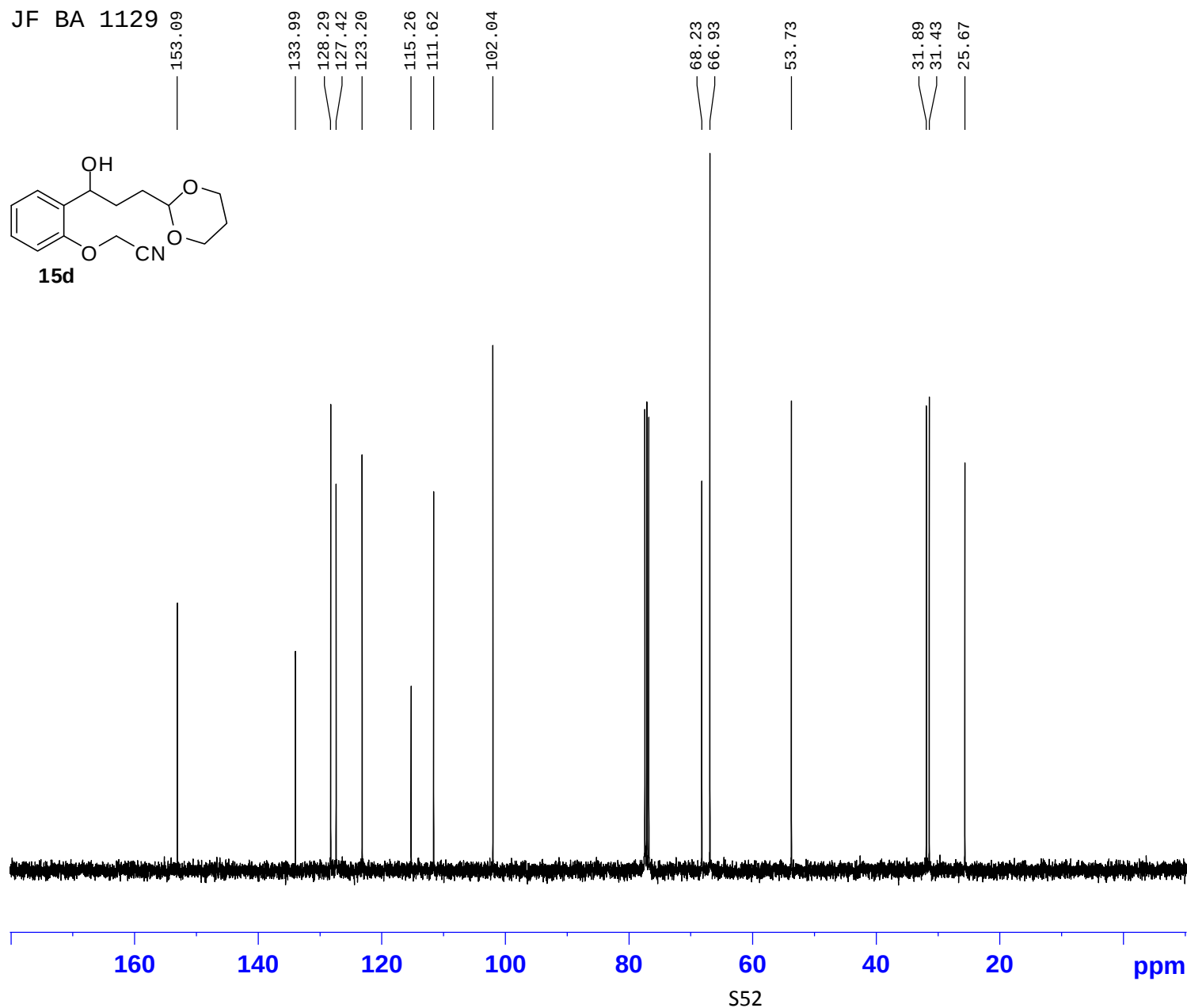
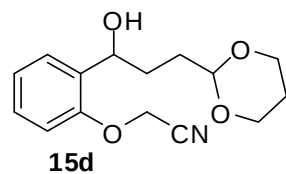
Current Data Parameters
NAME 20140205
EXPNO 320
PROCNO 1

F2 - Acquisition Parameters
Date_ 20140205
Time 15.17
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 71.8
DW 60.800 usec
DE 10.00 usec
TE 300.0 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1298542 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00

JF BA 1129



Current Data Parameters
NAME 20140205
EXPNO 600
PROCNO 1

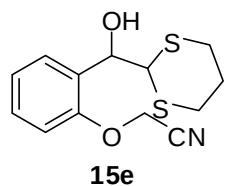
F2 - Acquisition Parameters
Date_ 20140205
Time 22.44
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 64
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 23170.5
DW 19.100 usec
DE 10.00 usec
TE 295.2 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

DGP BA V83g

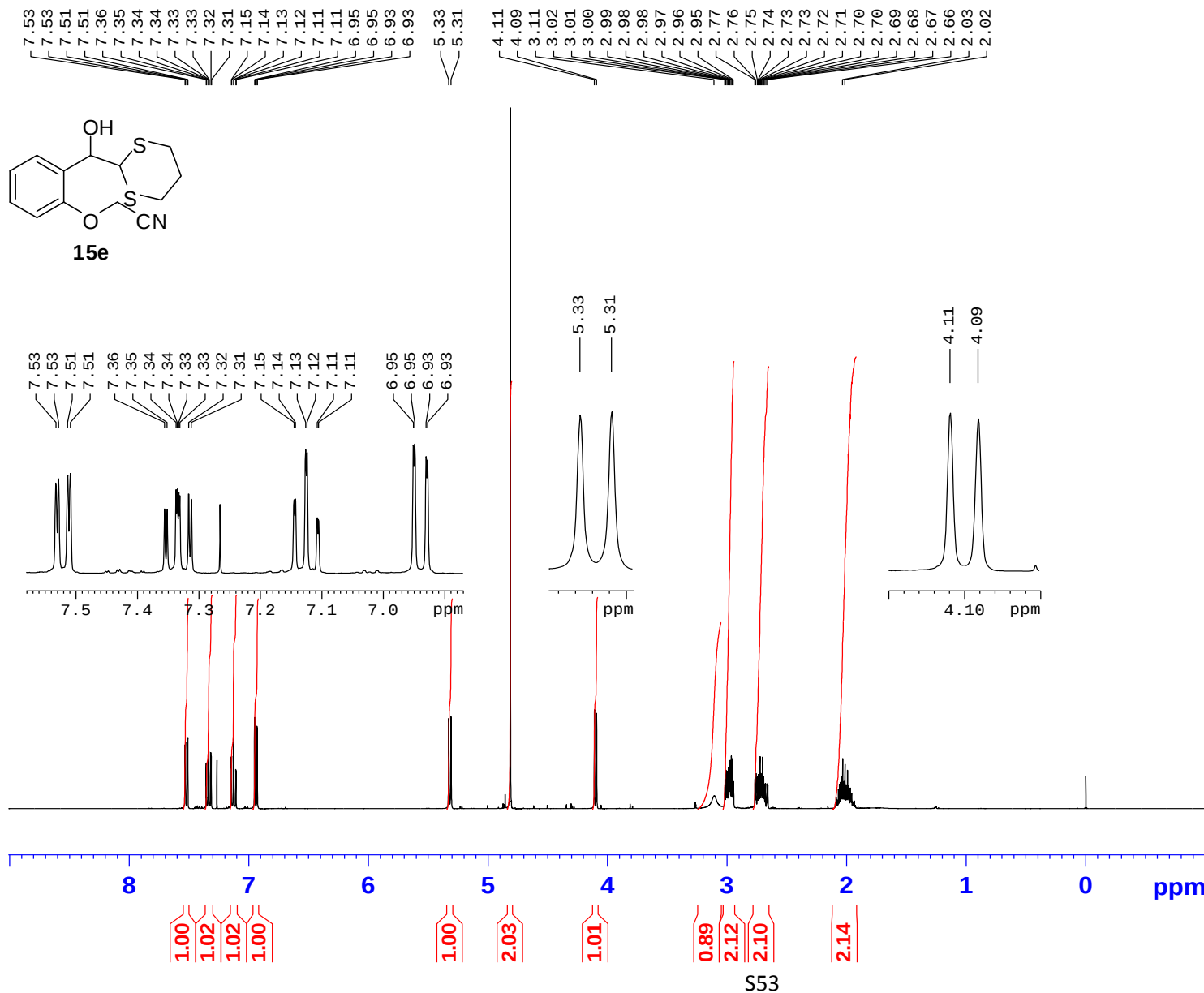


Current Data Parameters
 NAME 20130708
 EXPNO 290
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20130708
 Time 14.08
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.125483 Hz
 AQ 3.9846387 sec
 RG 101.6
 DW 60.800 usec
 DE 10.00 usec
 TE 296.1 K
 D1 1.00000000 sec
 TD0 1

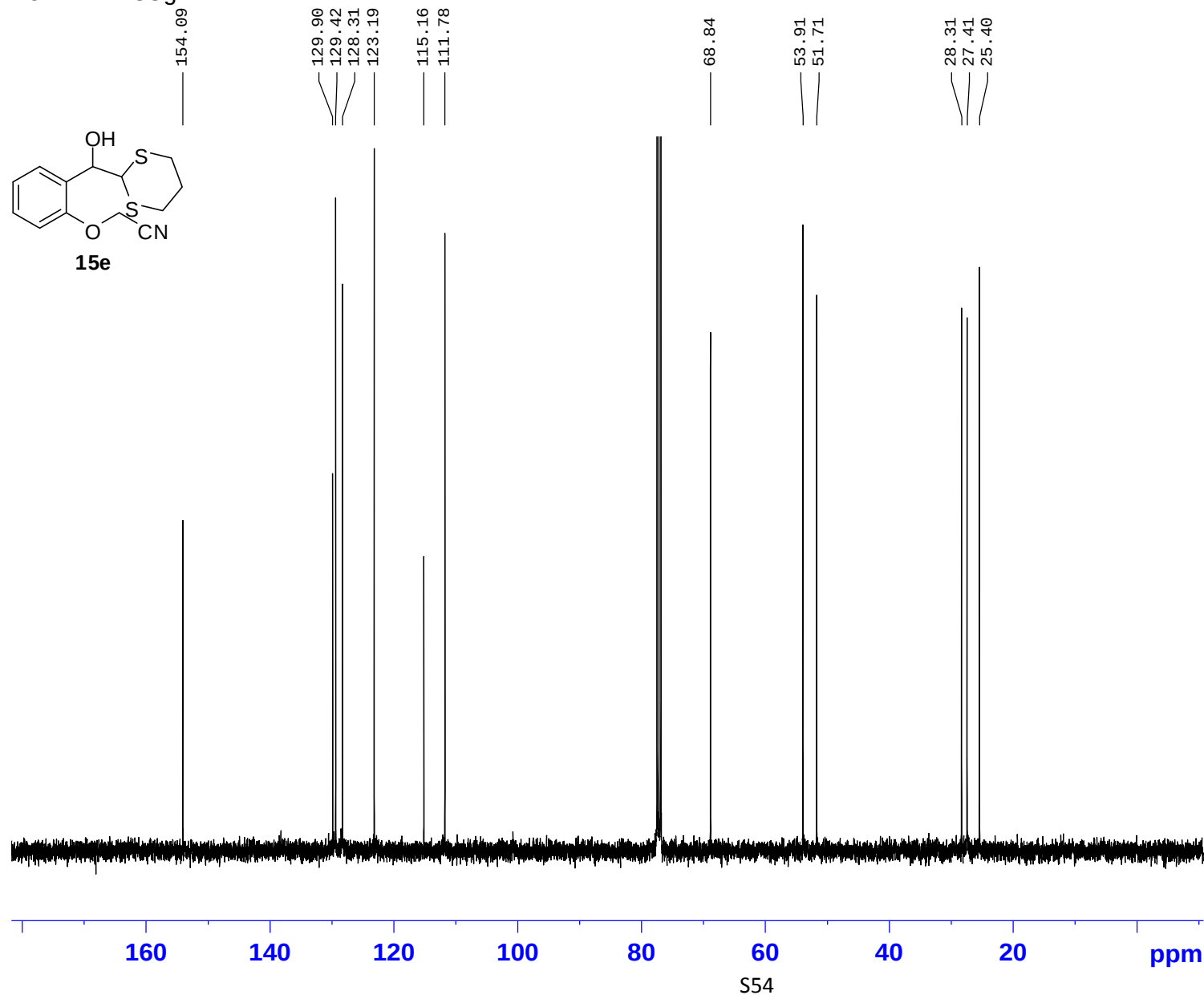
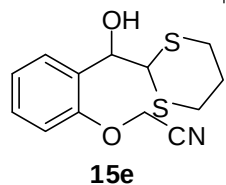
===== CHANNEL f1 =====
 NUC1 1H
 P1 10.50 usec
 PL1 -6.00 dB
 SF01 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300075 MHz
 WDW EM
 SSB 0
 LB 0.00 Hz
 GB 0
 PC 1.00



S53

DGP BA V83g



Current Data Parameters
NAME 20130708
EXPNO 580
PROCNO 1

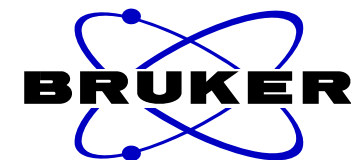
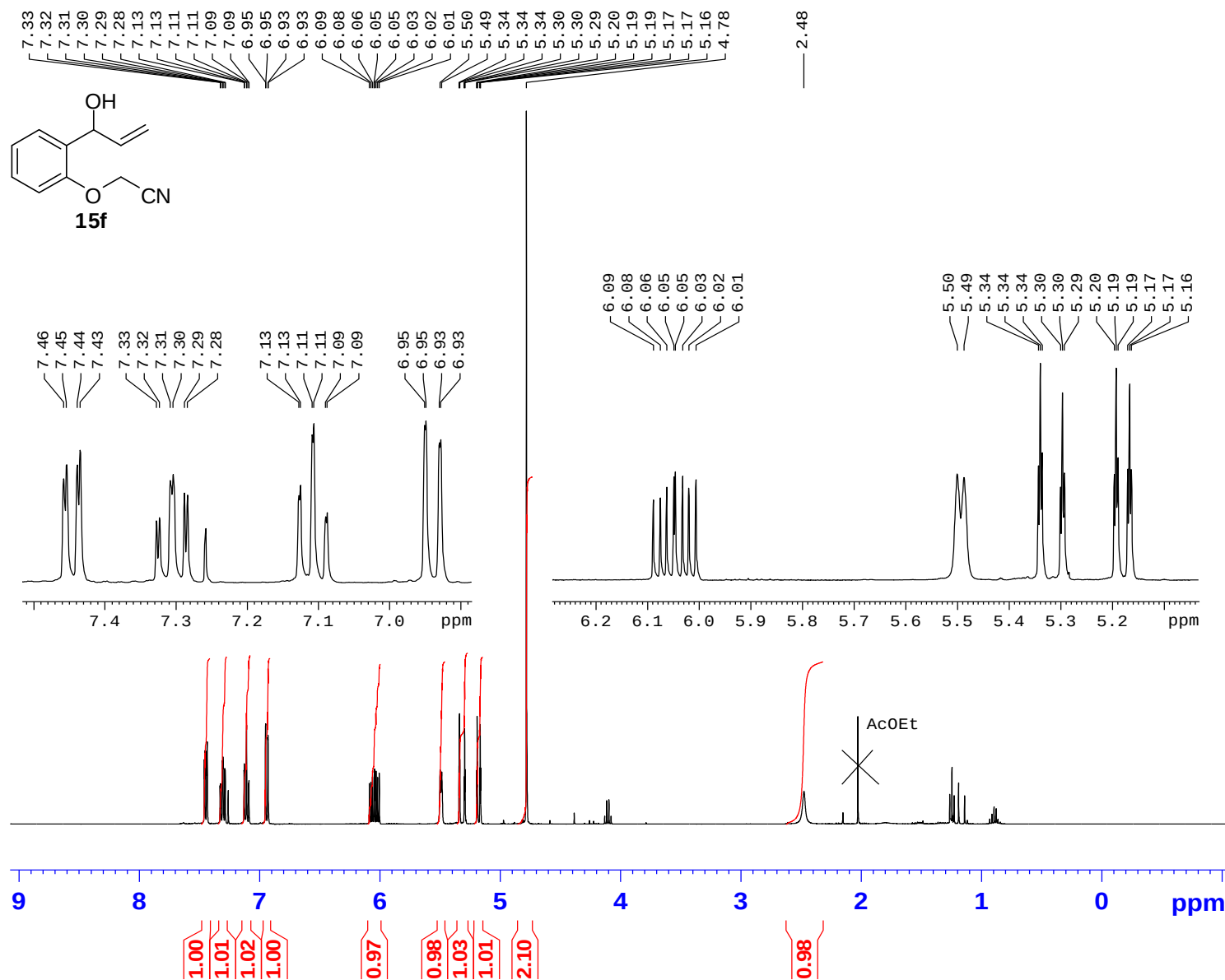
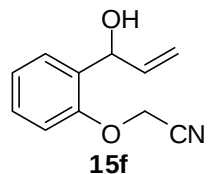
F2 - Acquisition Parameters
Date_ 20130708
Time 22.47
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 128
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 26008
DW 19.100 usec
DE 10.00 usec
TE 300.0 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

BA 1091



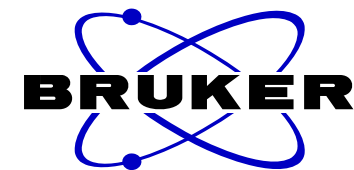
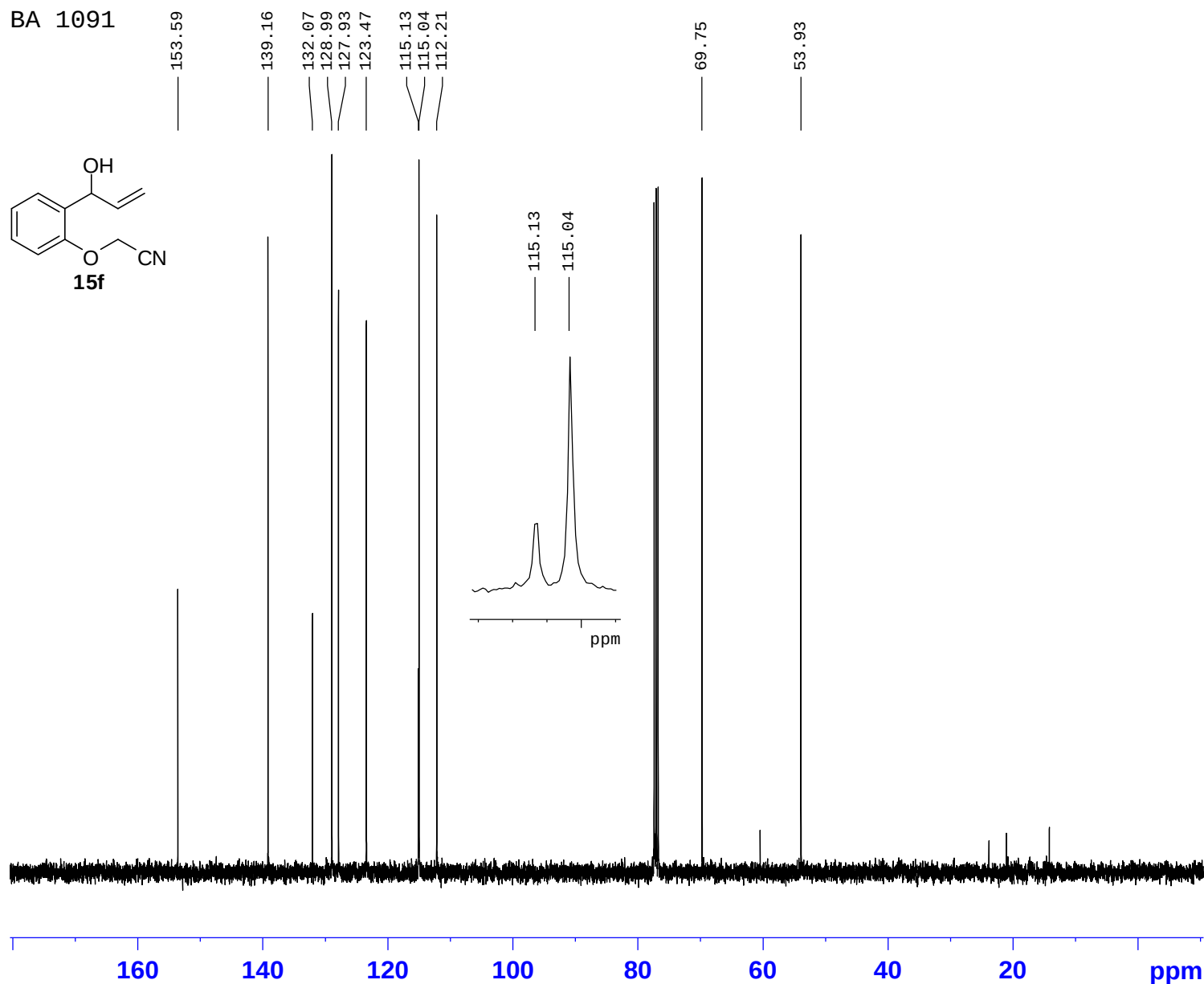
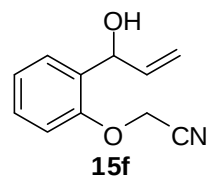
Current Data Parameters
 NAME 20120217
 EXPNO 794
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20120219
 Time 22.33
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.125483 Hz
 AQ 3.9846387 sec
 RG 101.6
 DW 60.800 usec
 DE 10.00 usec
 TE 295.5 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 10.50 usec
 PL1 -6.00 dB
 SF01 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300104 MHz
 WDW EM
 SSB 0
 LB 0.00 Hz
 GB 0
 PC 1.00

BA 1091



Current Data Parameters
 NAME 20120217
 EXPNO 790
 PROCNO 1

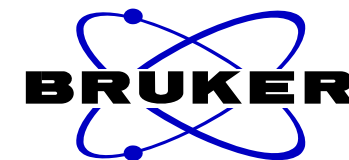
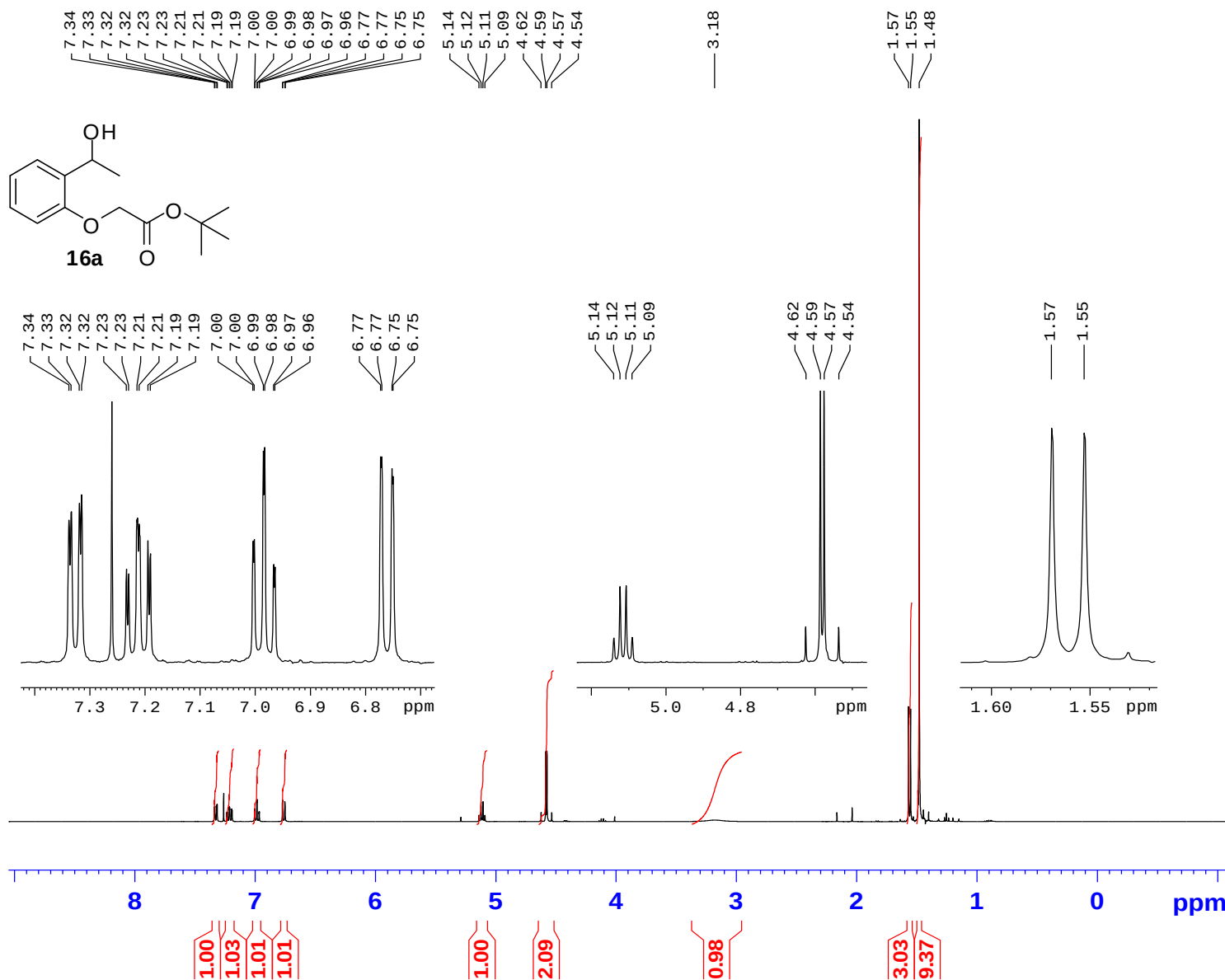
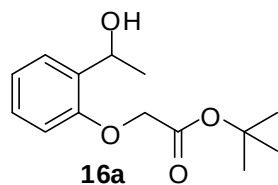
F2 - Acquisition Parameters
 Date_ 20120219
 Time 22.17
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 128
 DS 4
 SWH 26178.010 Hz
 FIDRES 0.399445 Hz
 AQ 1.2517875 sec
 RG 26008
 DW 19.100 usec
 DE 10.00 usec
 TE 296.0 K
 D1 2.00000000 sec
 d11 0.03000000 sec
 DELTA 1.89999998 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 13C
 P1 6.50 usec
 PL1 -4.00 dB
 SF01 100.6228292 MHz

===== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PL2 -4.00 dB
 PL12 11.78 dB
 PL13 18.75 dB
 SF02 400.1316005 MHz

F2 - Processing parameters
 SI 32768
 SF 100.6127690 MHz
 wDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

BA 1056



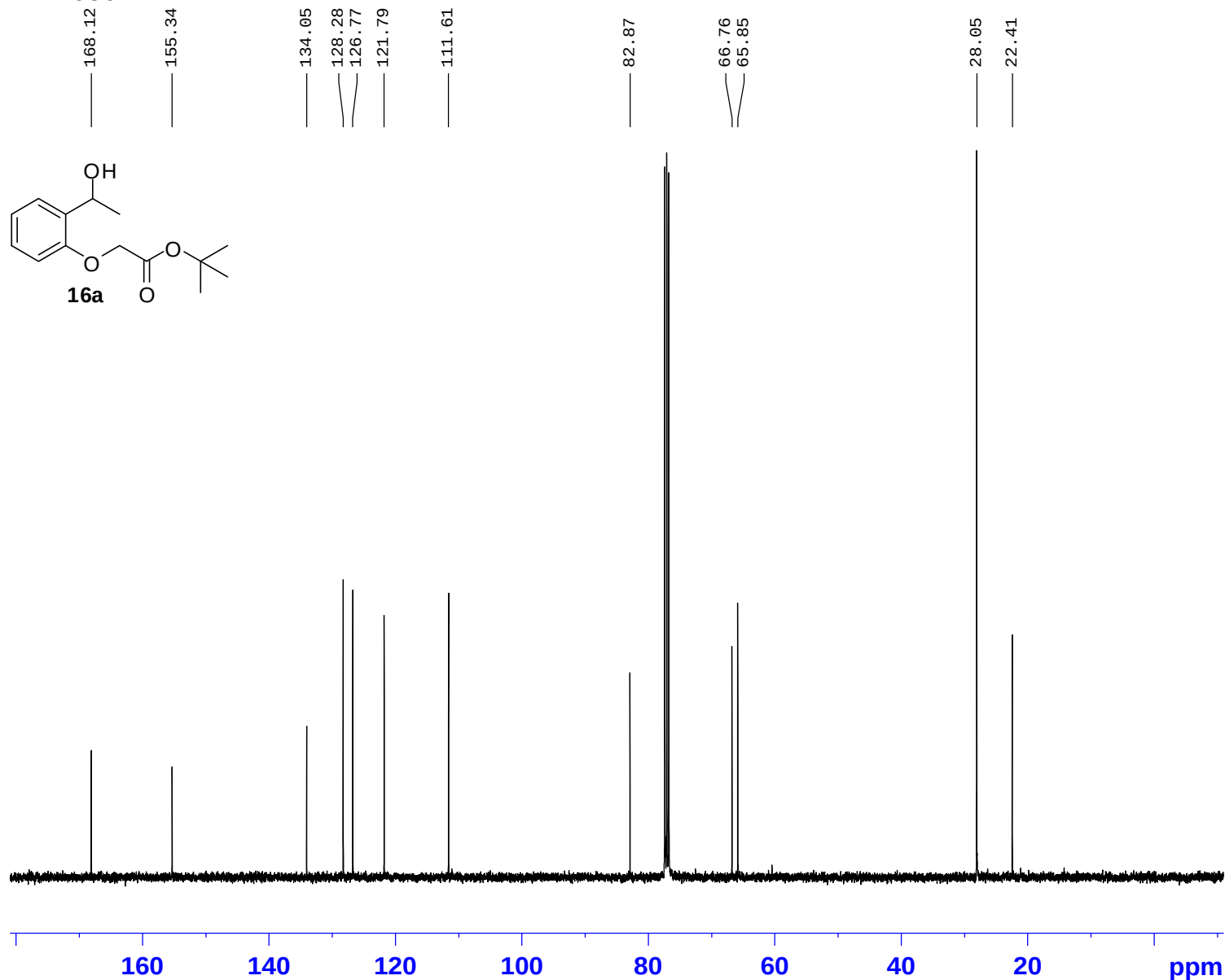
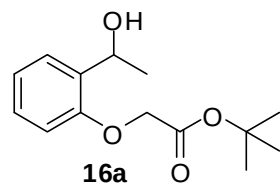
Current Data Parameters
 NAME 20120203
 EXPNO 542
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20120204
 Time 0.07
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 8278.146 Hz
 FIDRES 0.126314 Hz
 AQ 3.9584243 sec
 RG 128
 DW 60.400 usec
 DE 10.00 usec
 TE 294.4 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 10.50 usec
 PL1 -6.00 dB
 SF01 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300095 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

BA 1056



Current Data Parameters
NAME 20120203
EXPNO 540
PROCNO 1

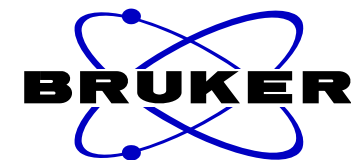
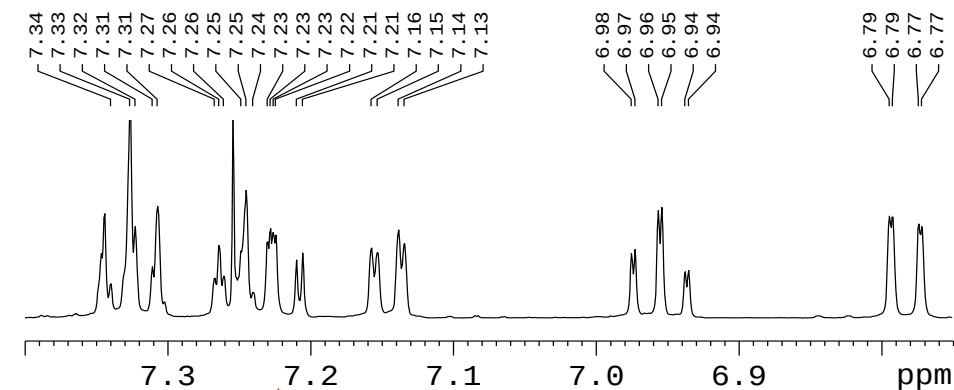
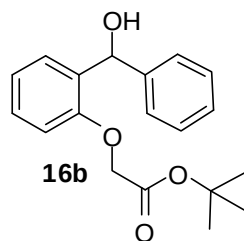
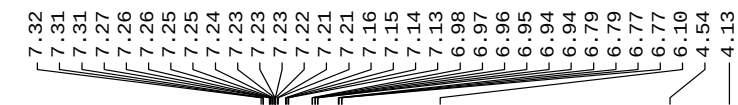
F2 - Acquisition Parameters
Date_ 20120203
Time 23.47
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 512
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 29193
DW 19.100 usec
DE 10.00 usec
TE 294.9 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

DGP BA 1059

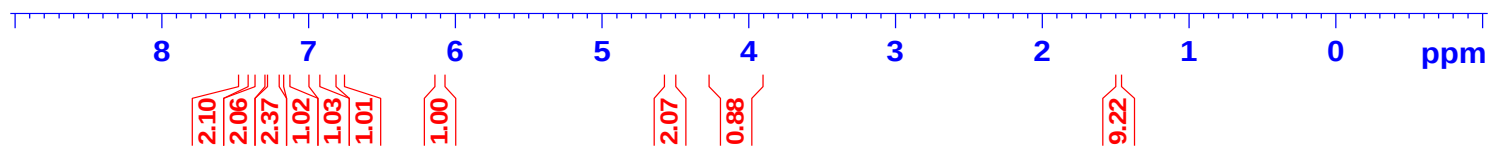


Current Data Parameters
 NAME 20131108
 EXPNO 510
 PROCNO 1

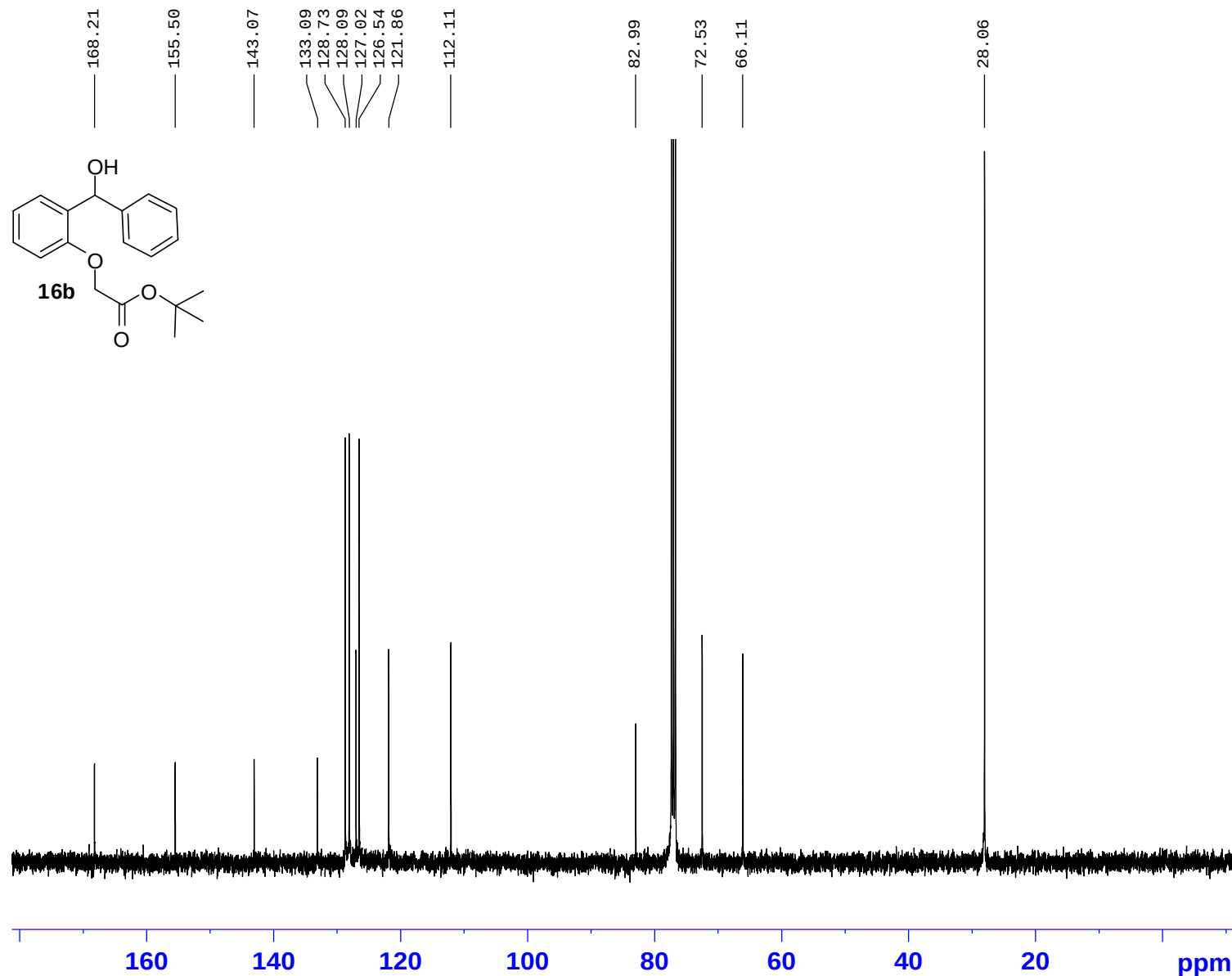
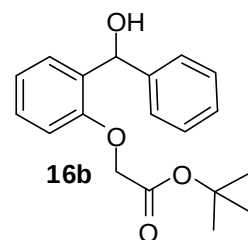
F2 - Acquisition Parameters
 Date_ 20131108
 Time 18.50
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDCl₃
 NS 16
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.125483 Hz
 AQ 3.9846387 sec
 RG 181
 DW 60.800 usec
 DE 10.00 usec
 TE 295.2 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 10.50 usec
 PL1 -6.00 dB
 SF01 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300116 MHz
 WDW EM
 SSB 0
 LB 0.00 Hz
 GB 0
 PC 1.00



DGP BA 1059



Current Data Parameters
 NAME 20131113
 EXPNO 320
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20131113
 Time 16.15
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 512
 DS 4
 SWH 26178.010 Hz
 FIDRES 0.399445 Hz
 AQ 1.2517875 sec
 RG 26008
 DW 19.100 usec
 DE 10.00 usec
 TE 300.0 K
 D1 2.00000000 sec
 d11 0.03000000 sec
 DELTA 1.89999998 sec
 TD0 1

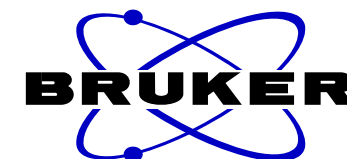
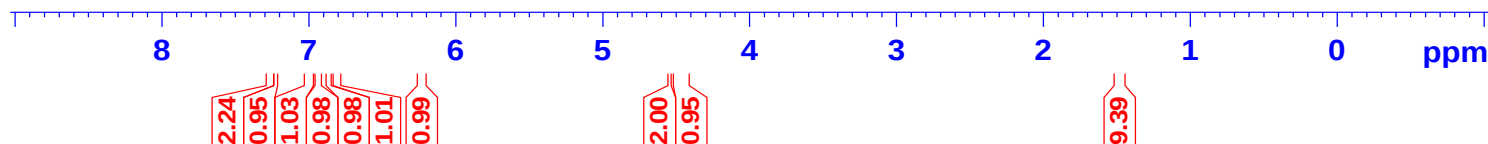
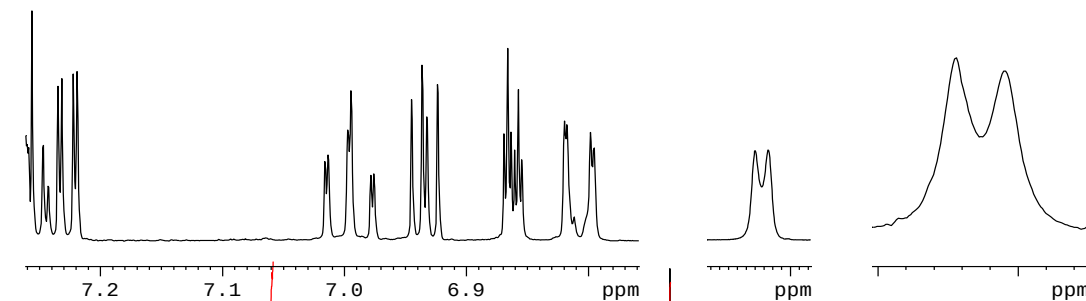
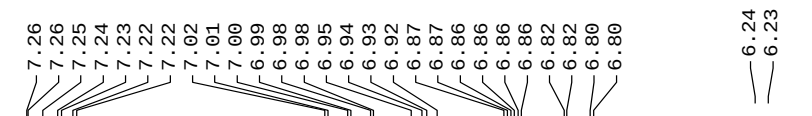
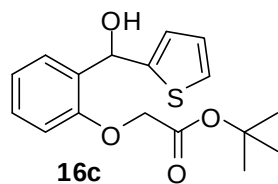
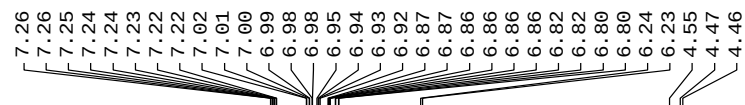
===== CHANNEL f1 =====
 NUC1 13C
 P1 6.50 usec
 PL1 -4.00 dB
 SF01 100.6228292 MHz

===== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PL2 -4.00 dB
 PL12 11.78 dB
 PL13 18.75 dB
 SF02 400.1316005 MHz

F2 - Processing parameters
 SI 32768
 SF 100.6127690 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

S60

DGP BA 1128



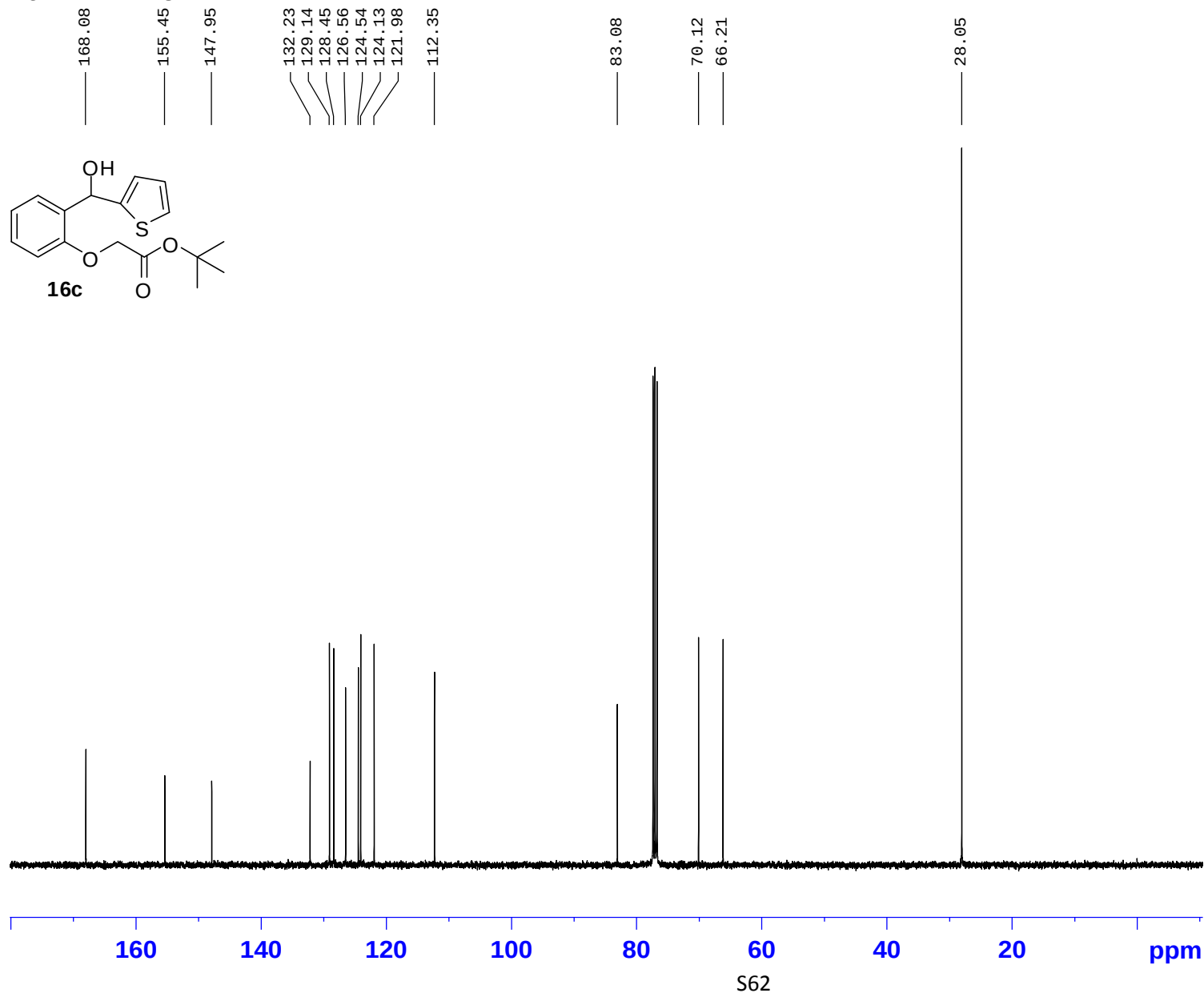
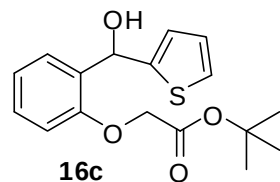
Current Data Parameters
NAME 20131113
EXPNO 300
PROCNO 1

F2 - Acquisition Parameters
Date_ 20131113
Time 15.32
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 181
DW 60.800 usec
DE 10.00 usec
TE 294.6 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300109 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00

DGP BA 1128



Current Data Parameters
 NAME 20131115
 EXPNO 600
 PROCNO 1

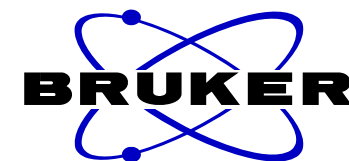
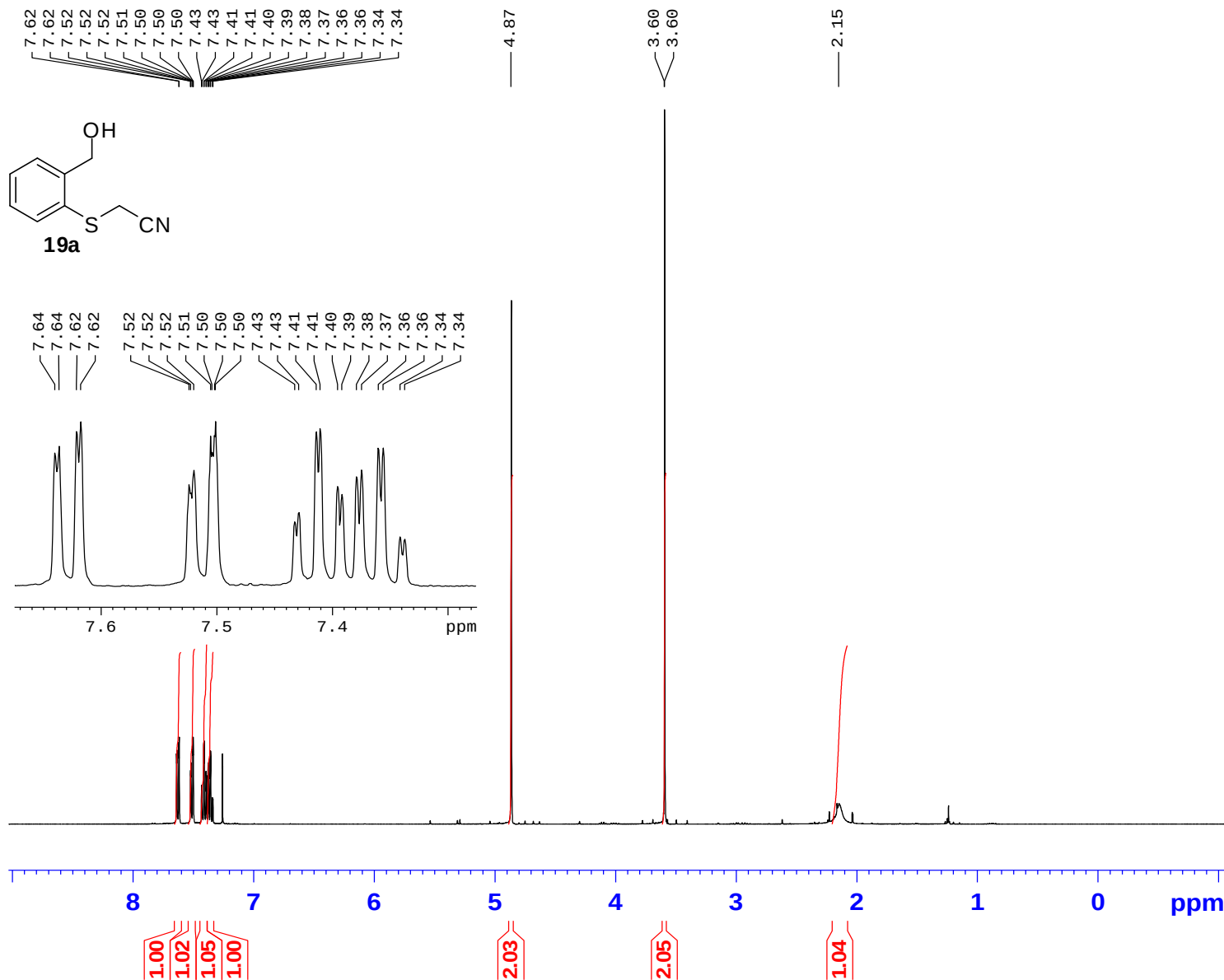
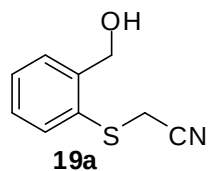
F2 - Acquisition Parameters
 Date_ 20131117
 Time 8.19
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 512
 DS 4
 SWH 26178.010 Hz
 FIDRES 0.399445 Hz
 AQ 1.2517875 sec
 RG 26008
 DW 19.100 usec
 DE 10.00 usec
 TE 295.2 K
 D1 2.00000000 sec
 d11 0.03000000 sec
 DELTA 1.89999998 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 13C
 P1 6.50 usec
 PL1 -4.00 dB
 SF01 100.6228292 MHz

===== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PL2 -4.00 dB
 PL12 11.78 dB
 PL13 18.75 dB
 SF02 400.1316005 MHz

F2 - Processing parameters
 SI 32768
 SF 100.6127690 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

BA 1162



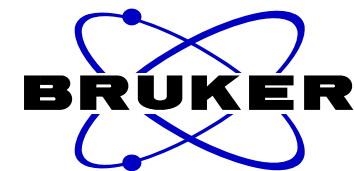
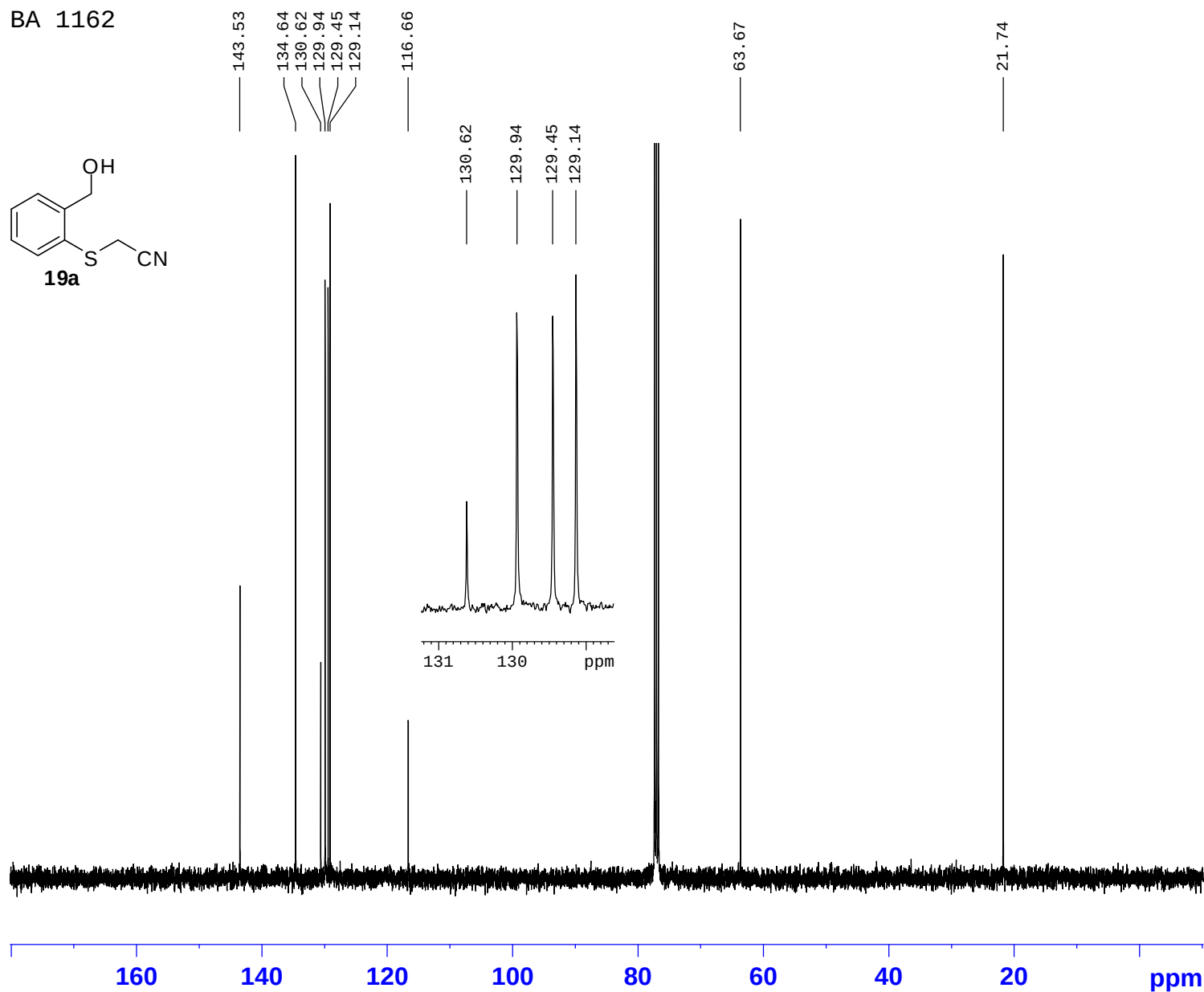
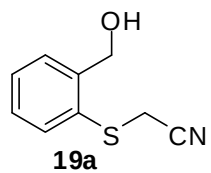
Current Data Parameters
 NAME 20120420
 EXPNO 544
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20120423
 Time 7.44
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.125483 Hz
 AQ 3.9846387 sec
 RG 181
 DW 60.800 usec
 DE 10.00 usec
 TE 295.7 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 10.50 usec
 PL1 -6.00 dB
 SF01 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300096 MHz
 WDW EM
 SSB 0
 LB 0.00 Hz
 GB 0
 PC 1.00

BA 1162



Current Data Parameters
 NAME 20120420
 EXPNO 540
 PROCNO 1

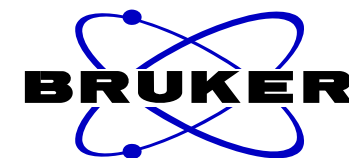
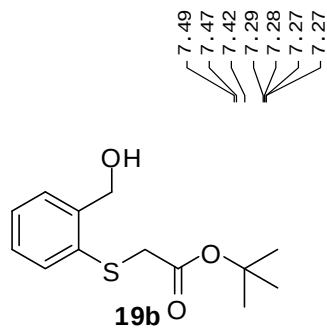
F2 - Acquisition Parameters
 Date_ 20120423
 Time 7.23
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 400
 DS 4
 SWH 26178.010 Hz
 FIDRES 0.399445 Hz
 AQ 1.2517875 sec
 RG 29193
 DW 19.100 usec
 DE 10.00 usec
 TE 296.4 K
 D1 2.00000000 sec
 d11 0.03000000 sec
 DELTA 1.89999998 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 13C
 P1 6.50 usec
 PL1 -4.00 dB
 SF01 100.6228292 MHz

===== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PL2 -4.00 dB
 PL12 11.78 dB
 PL13 18.75 dB
 SF02 400.1316005 MHz

F2 - Processing parameters
 SI 32768
 SF 100.6127690 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

BA 1163

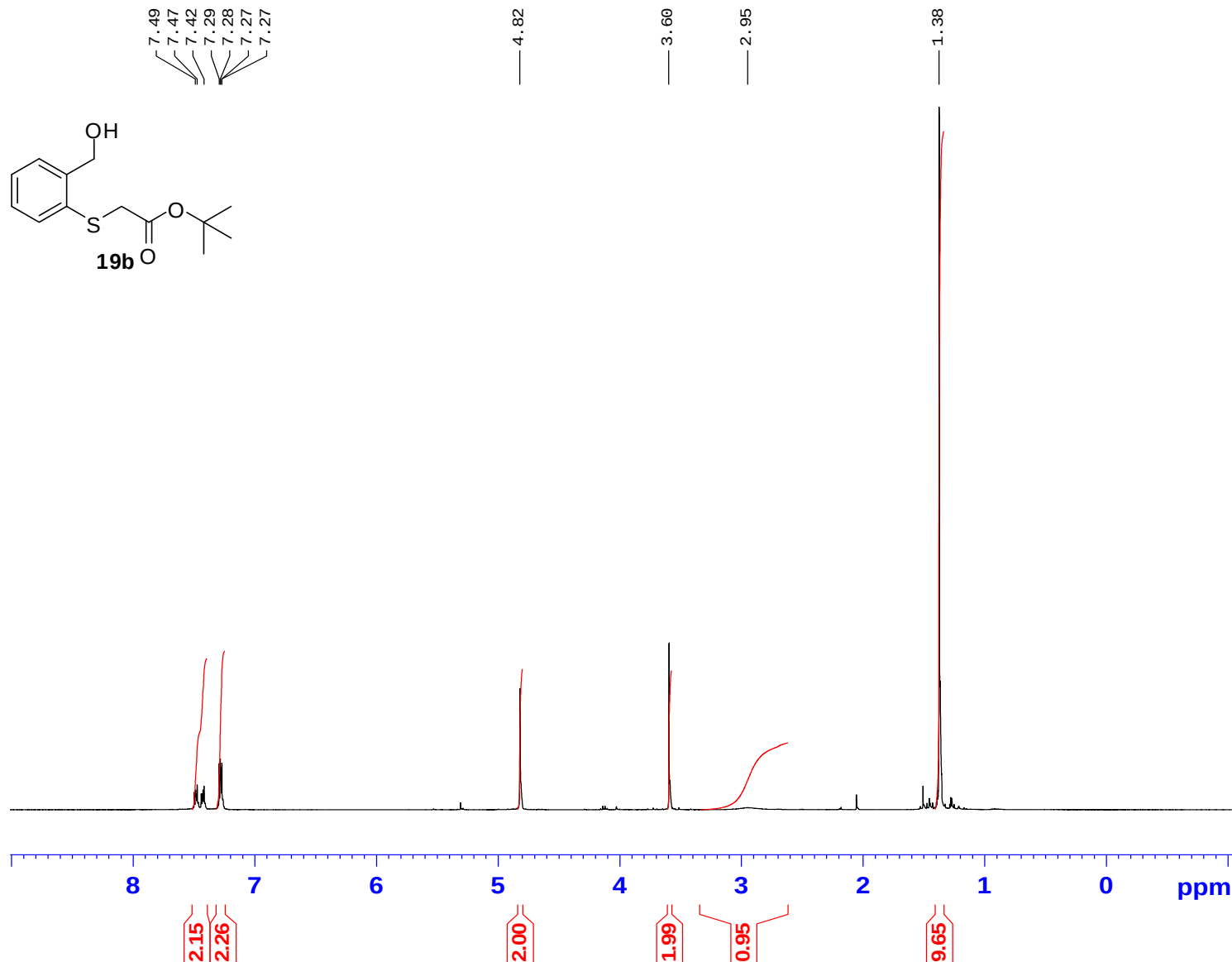


Current Data Parameters
NAME 20120420
EXPNO 532
PROCNO 1

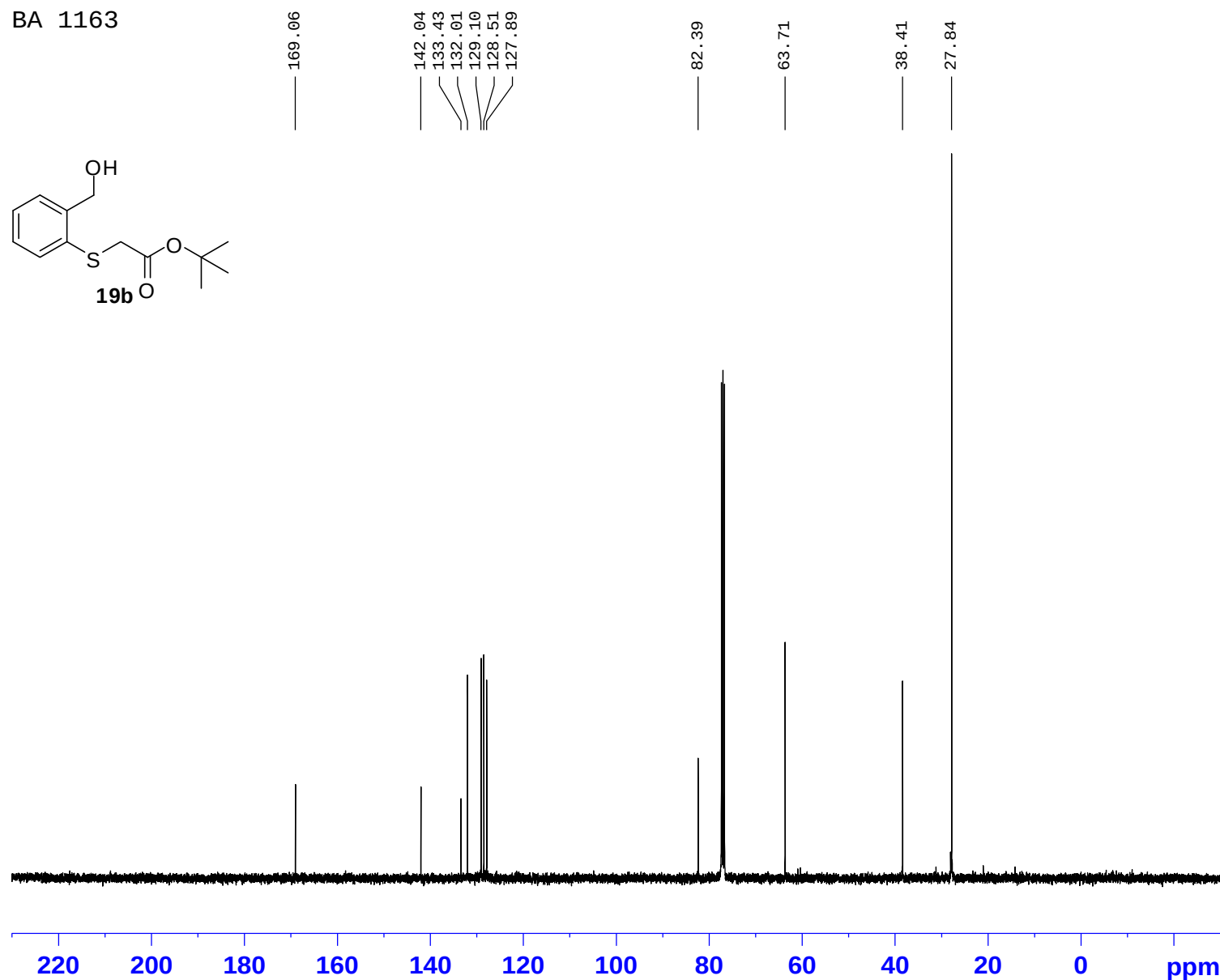
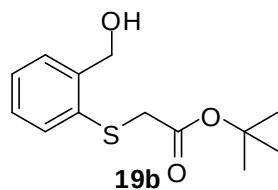
F2 - Acquisition Parameters
Date_ 20120423
Time 6.14
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 128
DW 60.800 usec
DE 10.00 usec
TE 295.8 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00



BA 1163



Current Data Parameters
NAME 20120420
EXPNO 530
PROCNO 1

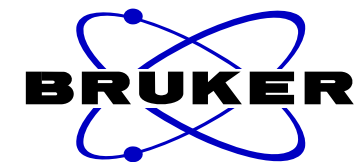
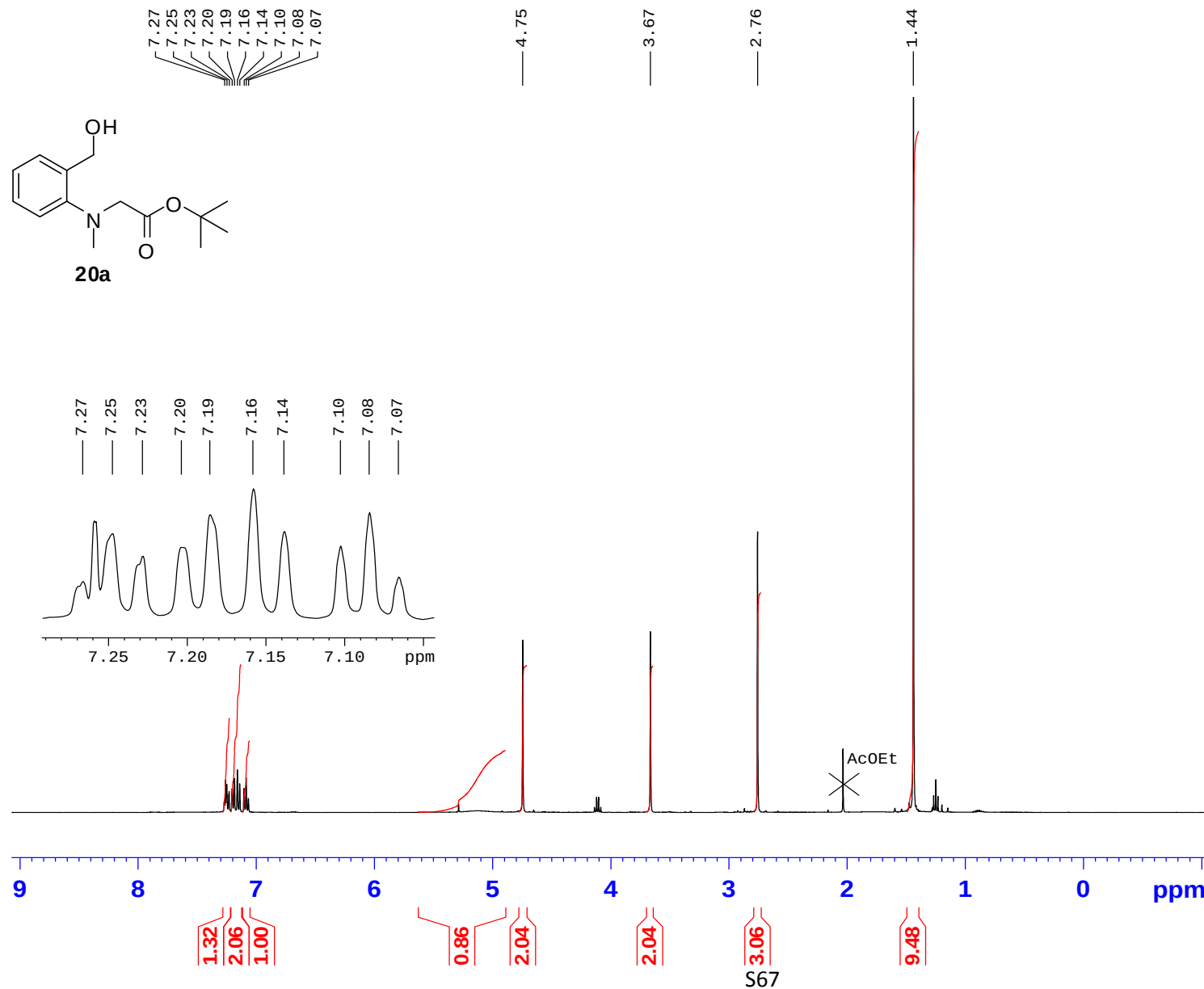
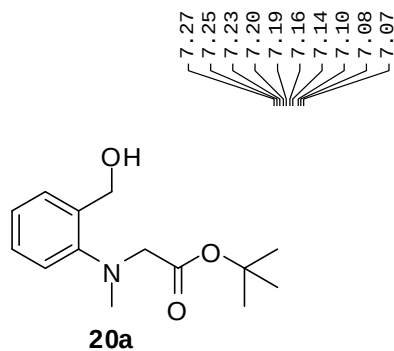
F2 - Acquisition Parameters
Date_ 20120423
Time 6.00
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 400
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 29193
DW 19.100 usec
DE 10.00 usec
TE 296.3 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

BA 1262



Current Data Parameters
 NAME 20120713
 EXPNO 612
 PROCNO 1

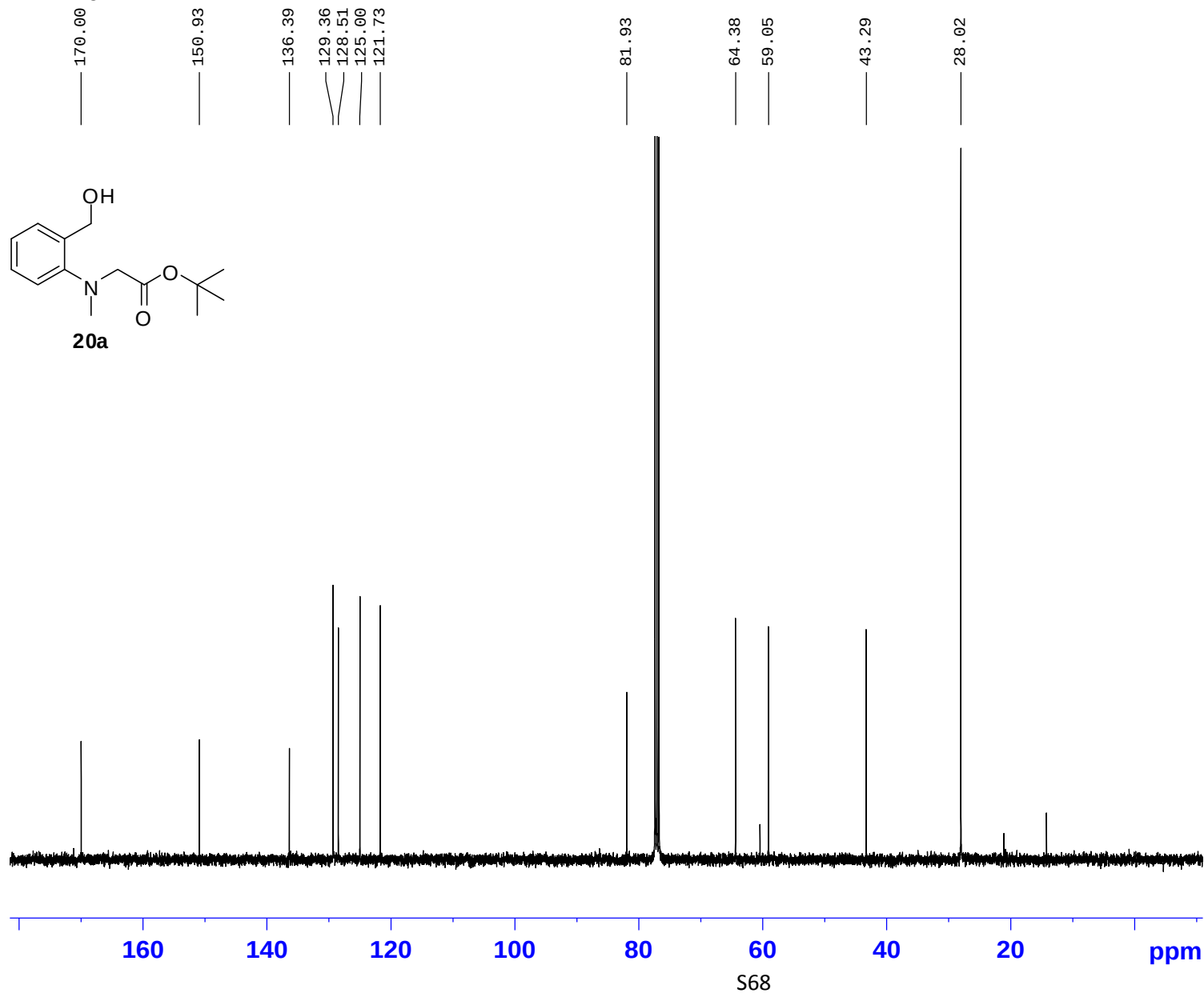
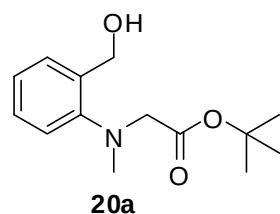
F2 - Acquisition Parameters
 Date_ 20120715
 Time 3.52
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 8278.146 Hz
 FIDRES 0.126314 Hz
 AQ 3.9584243 sec
 RG 101.6
 DW 60.400 usec
 DE 10.00 usec
 TE 296.3 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 10.50 usec
 PL1 -6.00 dB
 SF01 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300099 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

S67

BA 1262



Current Data Parameters
 NAME 20120713
 EXPNO 610
 PROCNO 1

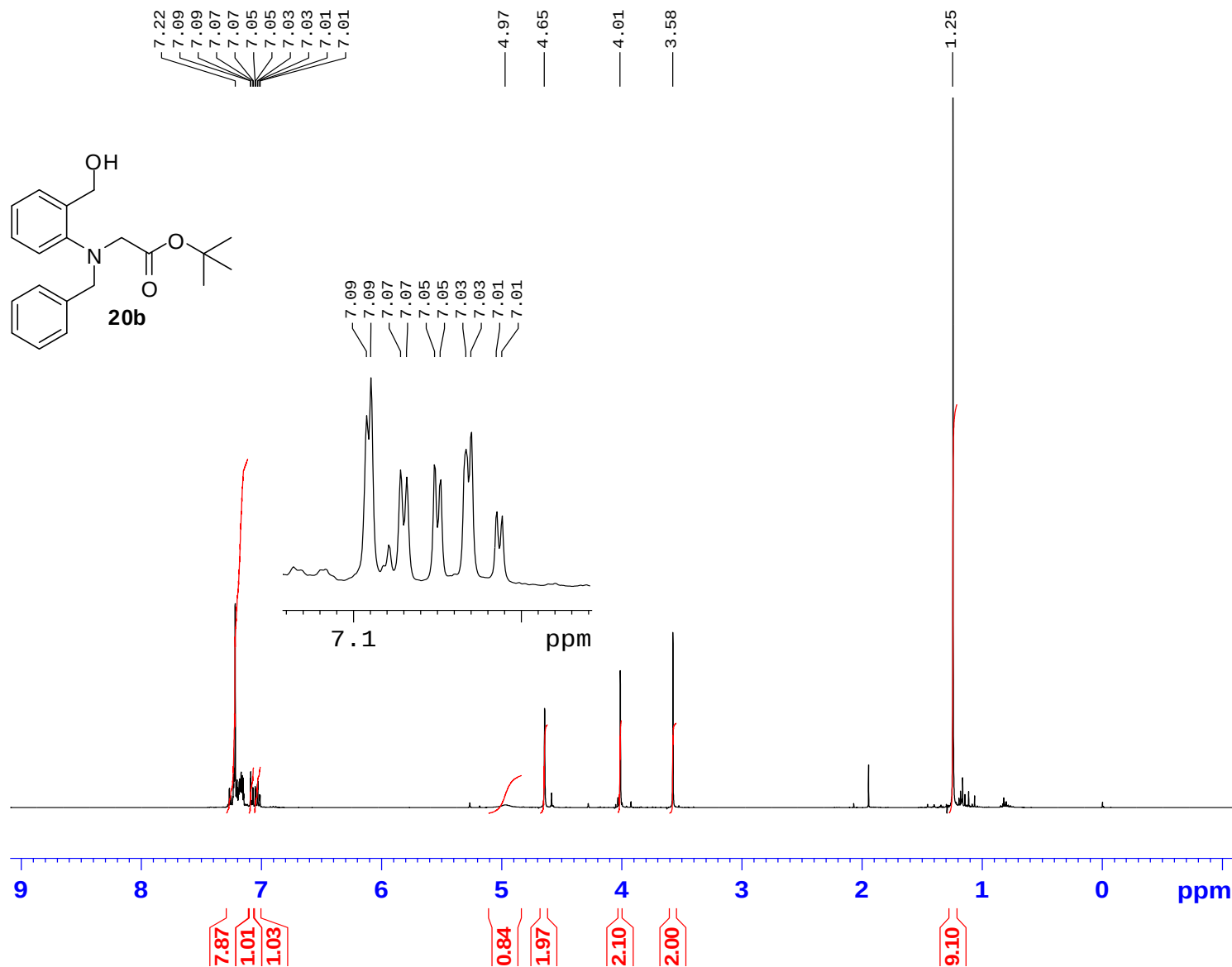
F2 - Acquisition Parameters
 Date_ 20120715
 Time 3.37
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 400
 DS 4
 SWH 26178.010 Hz
 FIDRES 0.399445 Hz
 AQ 1.2517875 sec
 RG 29193
 DW 19.100 usec
 DE 10.00 usec
 TE 296.7 K
 D1 2.00000000 sec
 d11 0.03000000 sec
 DELTA 1.89999998 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 13C
 P1 6.50 usec
 PL1 -4.00 dB
 SF01 100.6228292 MHz

===== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PL2 -4.00 dB
 PL12 11.78 dB
 PL13 18.75 dB
 SF02 400.1316005 MHz

F2 - Processing parameters
 SI 32768
 SF 100.6127690 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

TA 6-114



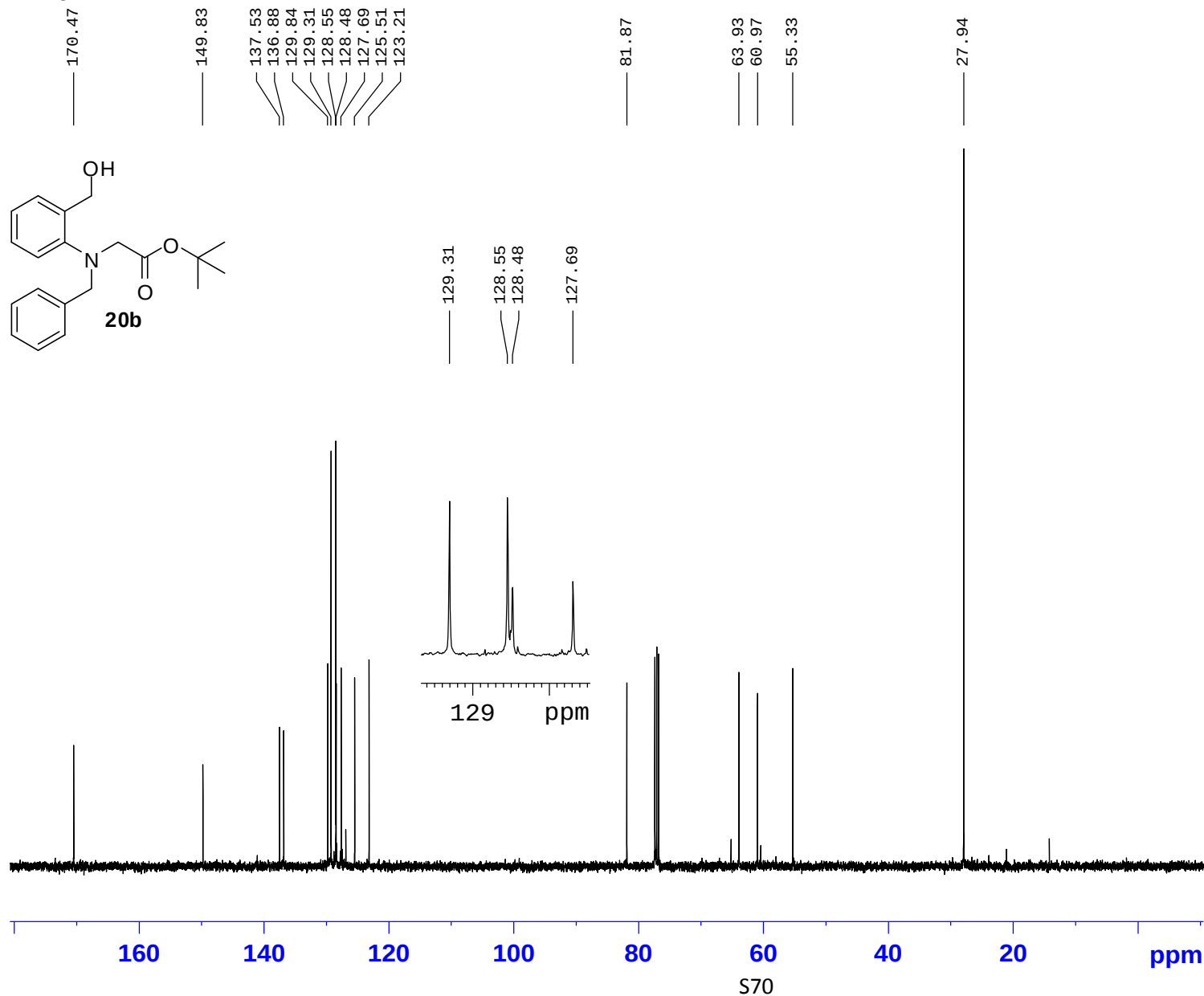
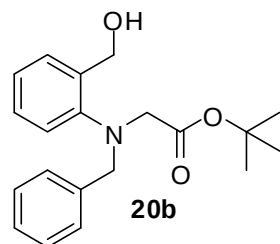
Current Data Parameters
 NAME 20140210
 EXPNO 672
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20140211
 Time 2.45
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 8278.146 Hz
 FIDRES 0.126314 Hz
 AQ 3.9584243 sec
 RG 50.8
 DW 60.400 usec
 DE 10.00 usec
 TE 300.0 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 10.50 usec
 PL1 -6.00 dB
 SF01 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300469 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

TA 6-114



Current Data Parameters
 NAME 20140210
 EXPNO 670
 PROCNO 1

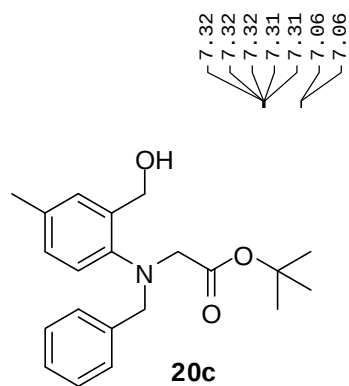
F2 - Acquisition Parameters
 Date_ 20140211
 Time 2.38
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 96
 DS 4
 SWH 26178.010 Hz
 FIDRES 0.399445 Hz
 AQ 1.2517875 sec
 RG 23170.5
 DW 19.100 usec
 DE 10.00 usec
 TE 295.4 K
 D1 2.00000000 sec
 d11 0.03000000 sec
 DELTA 1.89999998 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 13C
 P1 6.50 usec
 PL1 -4.00 dB
 SF01 100.6228292 MHz

===== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PL2 -4.00 dB
 PL12 11.78 dB
 PL13 18.75 dB
 SF02 400.1316005 MHz

F2 - Processing parameters
 SI 32768
 SF 100.6127690 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

DGP BA V108a

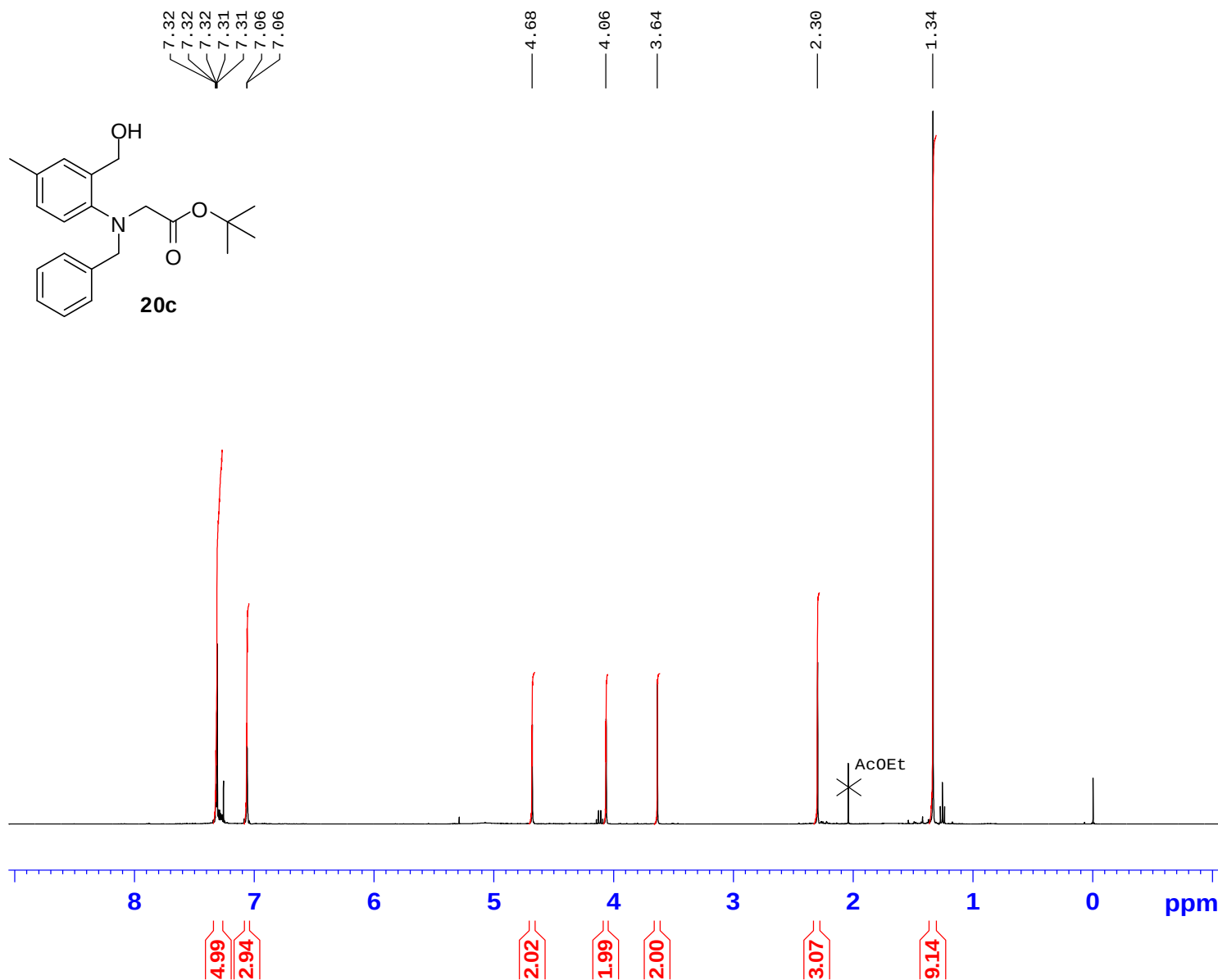


Current Data Parameters
NAME 20130712
EXPNO 230
PROCNO 1

F2 - Acquisition Parameters
Date_ 20130712
Time 11.12
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 181
DW 60.800 usec
DE 10.00 usec
TE 295.7 K
D1 1.00000000 sec
TD0 1

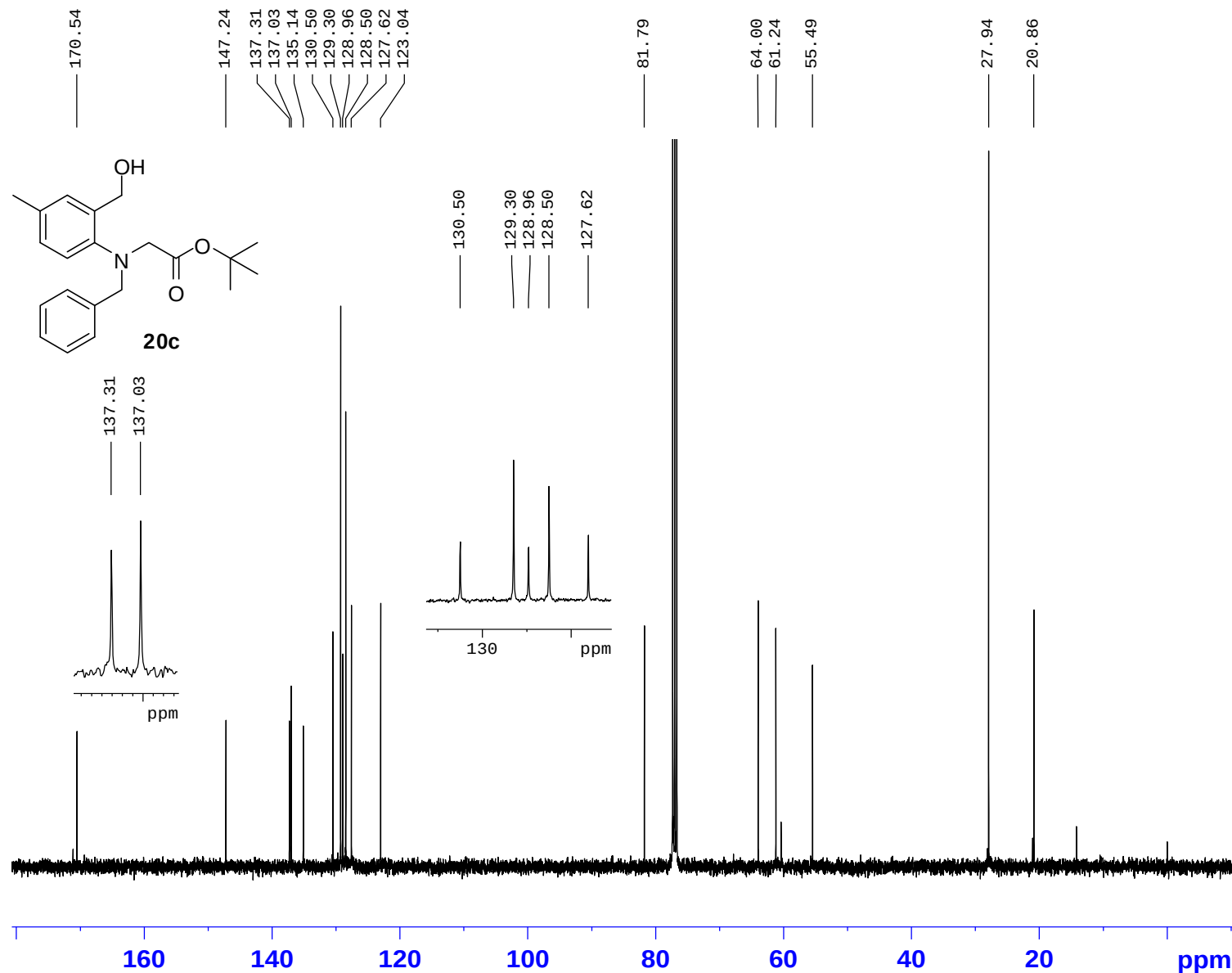
===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300095 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00



S71

DGP BA V108a



Current Data Parameters
 NAME 20130712
 EXPNO 700
 PROCNO 1

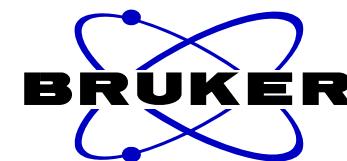
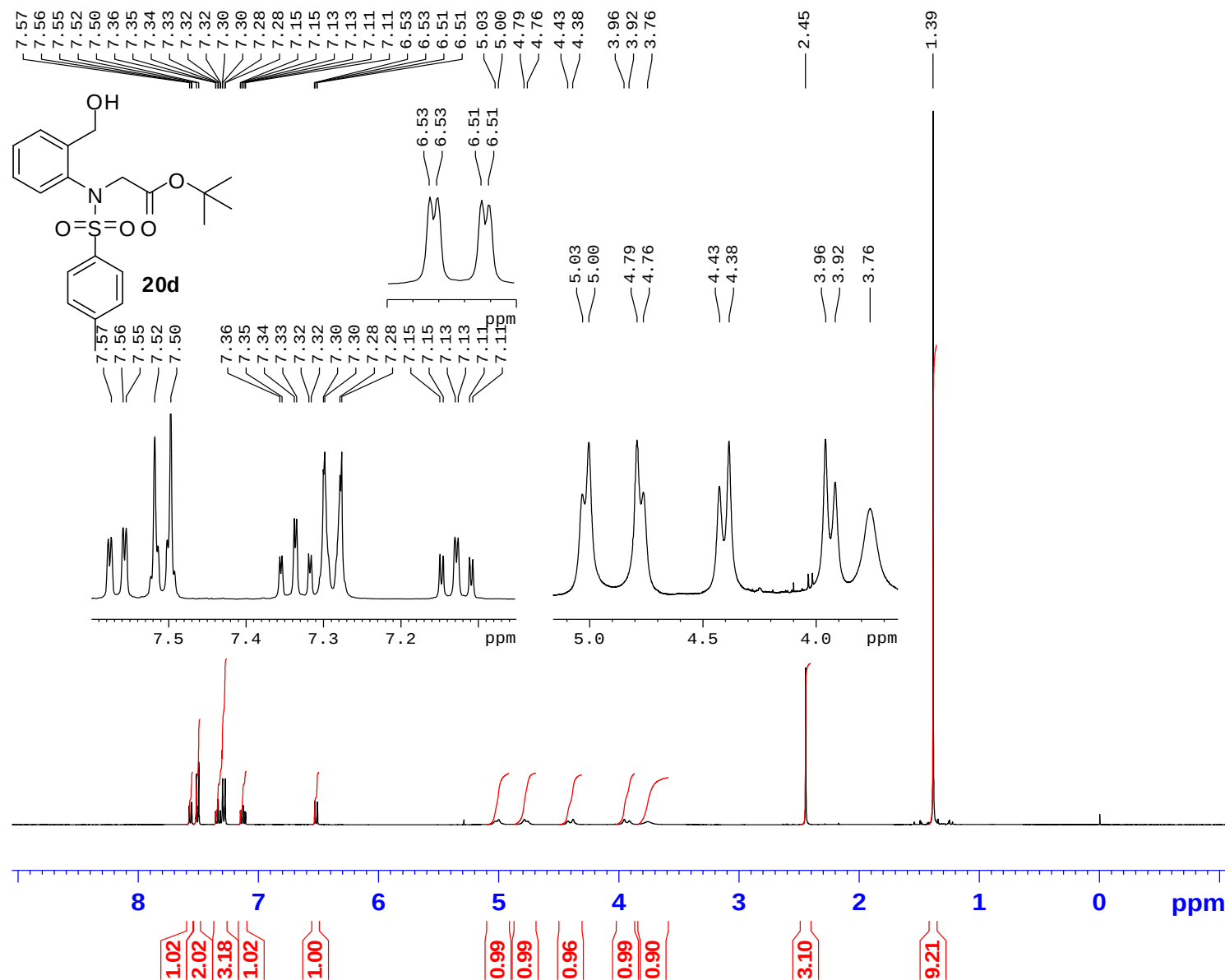
F2 - Acquisition Parameters
 Date_ 20130714
 Time 18.17
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 512
 DS 4
 SWH 26178.010 Hz
 FIDRES 0.399445 Hz
 AQ 1.2517875 sec
 RG 26008
 DW 19.100 usec
 DE 10.00 usec
 TE 296.7 K
 D1 2.00000000 sec
 d11 0.03000000 sec
 DELTA 1.89999998 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 13C
 P1 6.50 usec
 PL1 -4.00 dB
 SF01 100.6228292 MHz

===== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PL2 -4.00 dB
 PL12 11.78 dB
 PL13 18.75 dB
 SF02 400.1316005 MHz

F2 - Processing parameters
 SI 32768
 SF 100.6127702 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

DGP BA 1187



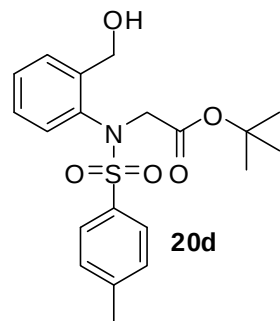
Current Data Parameters
 NAME 20131108
 EXPNO 620
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20131108
 Time 21.21
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.125483 Hz
 AQ 3.9846387 sec
 RG 80.6
 DW 60.800 usec
 DE 10.00 usec
 TE 295.2 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 10.50 usec
 PL1 -6.00 dB
 SF01 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300027 MHz
 WDW EM
 SSB 0
 LB 0.00 Hz
 GB 0
 PC 1.00

DGP BA 1187



144.31
142.62
138.29
134.06
131.47
129.57
129.28
128.39
128.31
127.40

82.92

61.65

54.19

27.91

21.63



Current Data Parameters
NAME 20131112
EXPNO 540
PROCNO 1

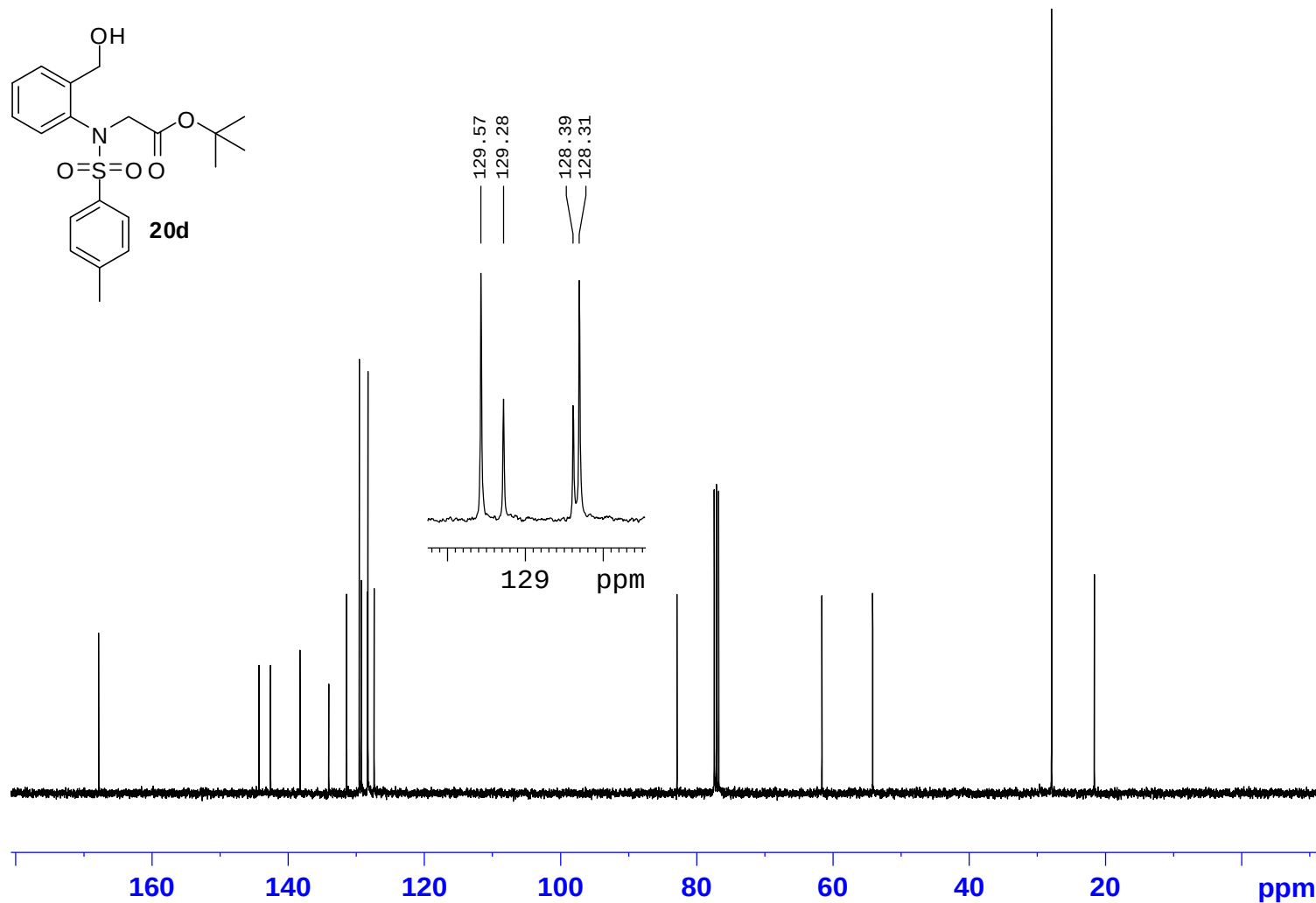
F2 - Acquisition Parameters

Date_ 20131112
Time 20.38
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 96
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 23170.5
DW 19.100 usec
DE 10.00 usec
TE 295.3 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

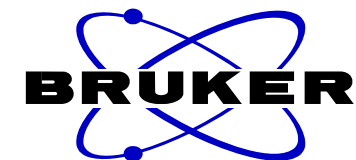
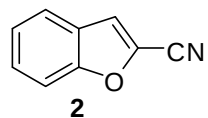
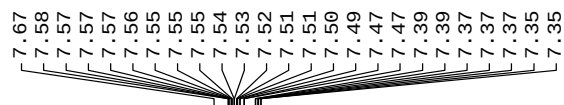
===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



JF 1004 F1

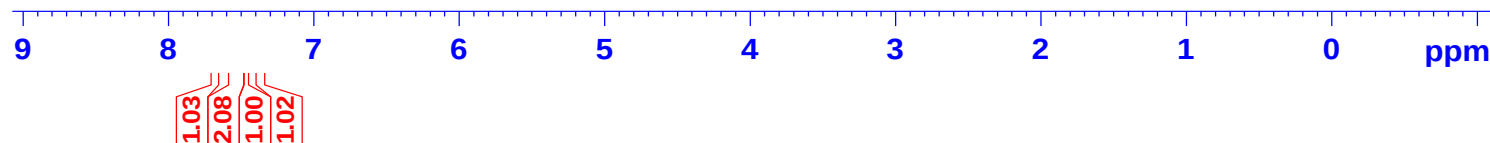
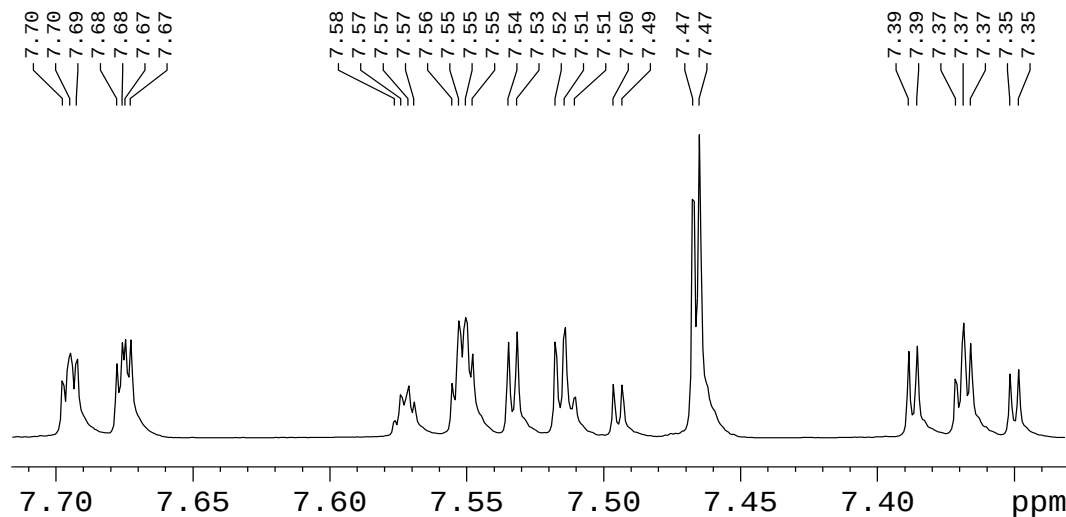


Current Data Parameters
NAME 20140210
EXPNO 50
PROCNO 1

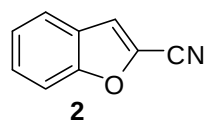
F2 - Acquisition Parameters
Date_ 20140210
Time 10.21
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 287.4
DW 60.800 usec
DE 10.00 usec
TE 294.0 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300097 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00



JF 1004 F1

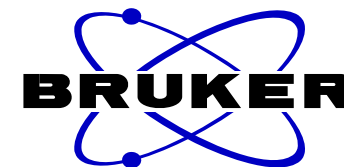


155.69

128.47
127.32
125.51
124.58
122.60
118.51
112.13
111.87

112.13
111.87

ppm



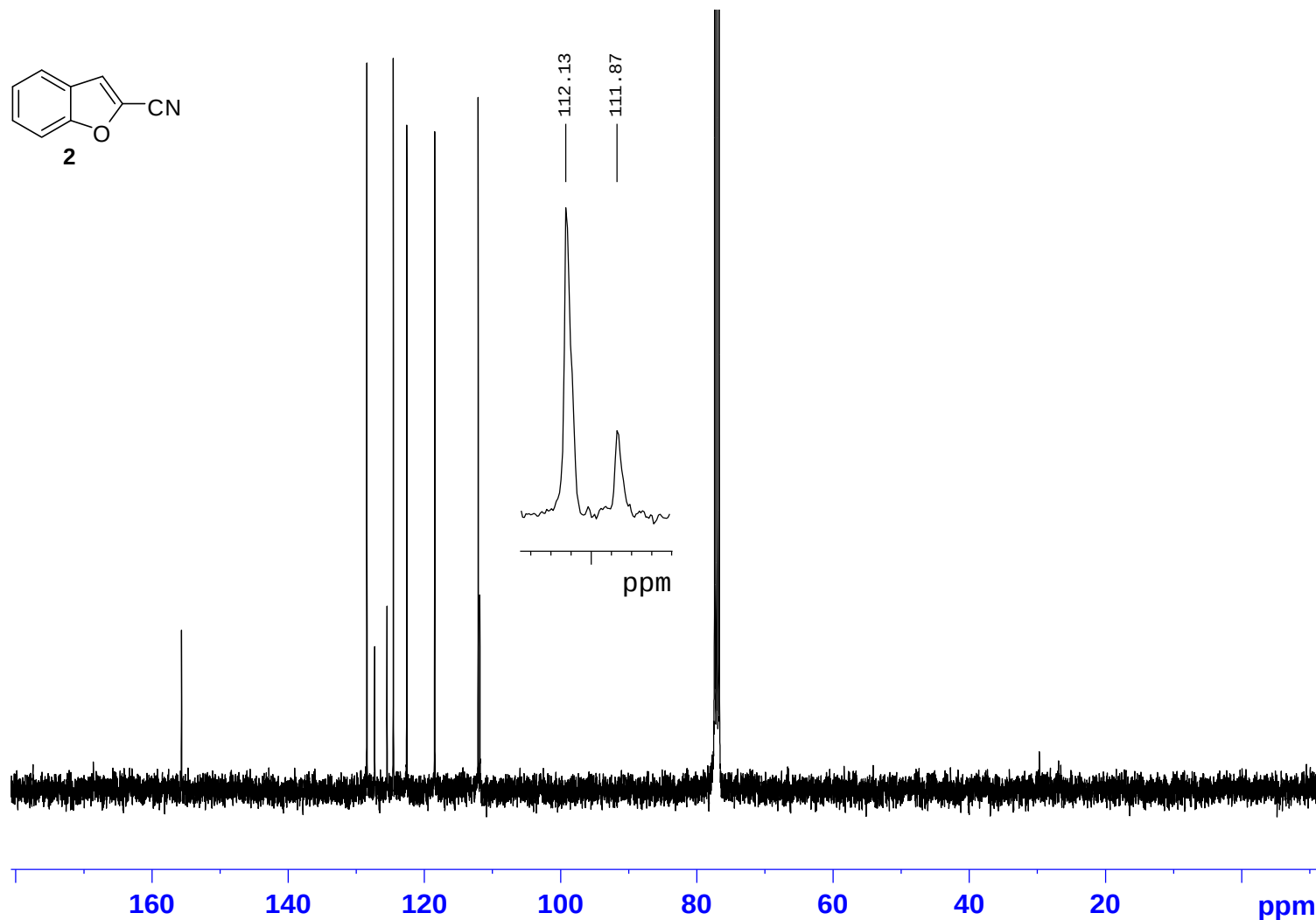
Current Data Parameters
NAME 20140211
EXPNO 740
PROCNO 1

F2 - Acquisition Parameters
Date_ 20140212
Time 7.29
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 800
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 23170.5
DW 19.100 usec
DE 10.00 usec
TE 300.0 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

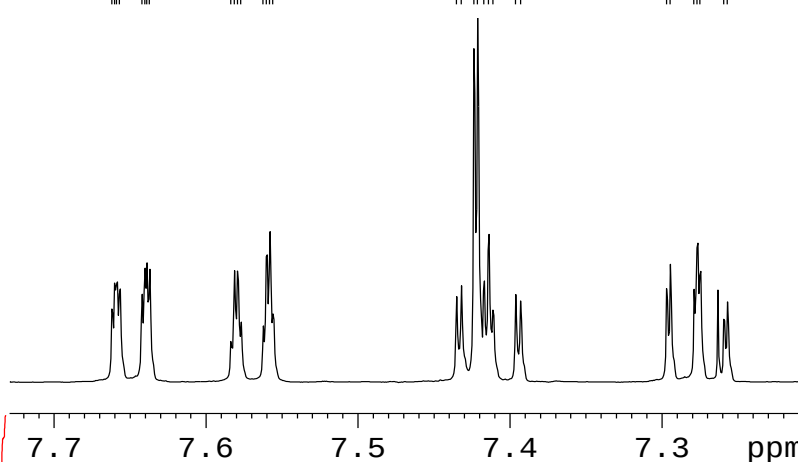
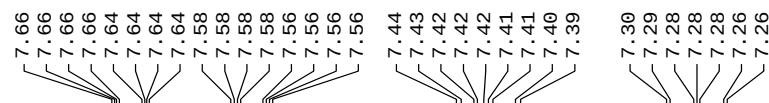
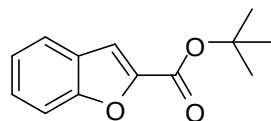
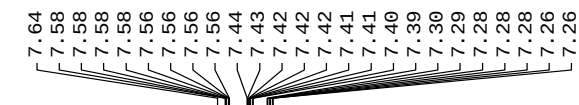
===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



DGP BA 1039



1.00
0.98
1.97
1.08

9.25



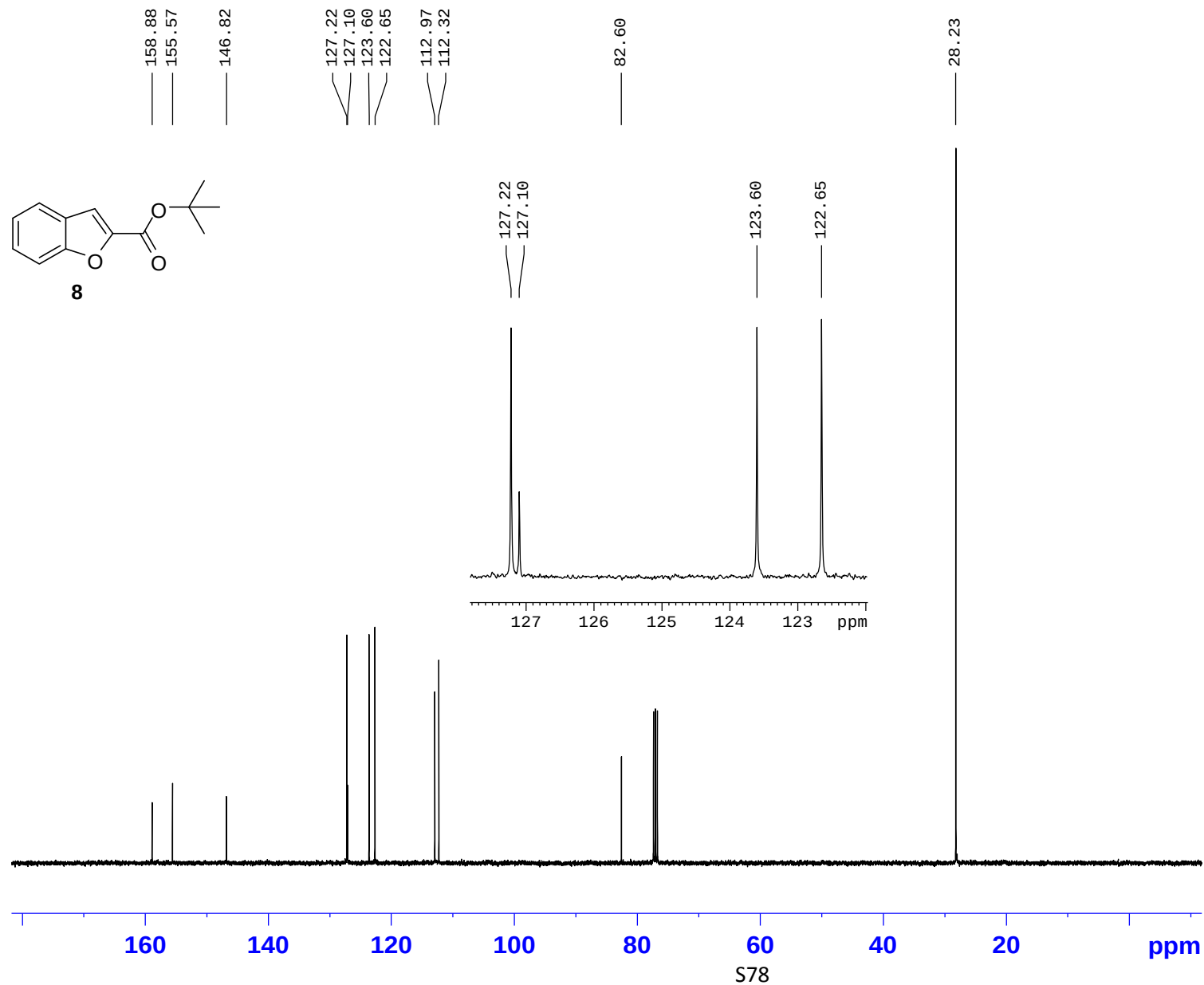
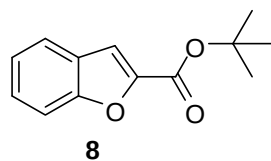
Current Data Parameters
NAME 20131113
EXPNO 240
PROCNO 1

F2 - Acquisition Parameters
Date_ 20131113
Time 13.47
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 80.6
DW 60.800 usec
DE 10.00 usec
TE 294.7 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300078 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00

DGP BA 1039



Current Data Parameters
 NAME 20131115
 EXPNO 550
 PROCNO 1

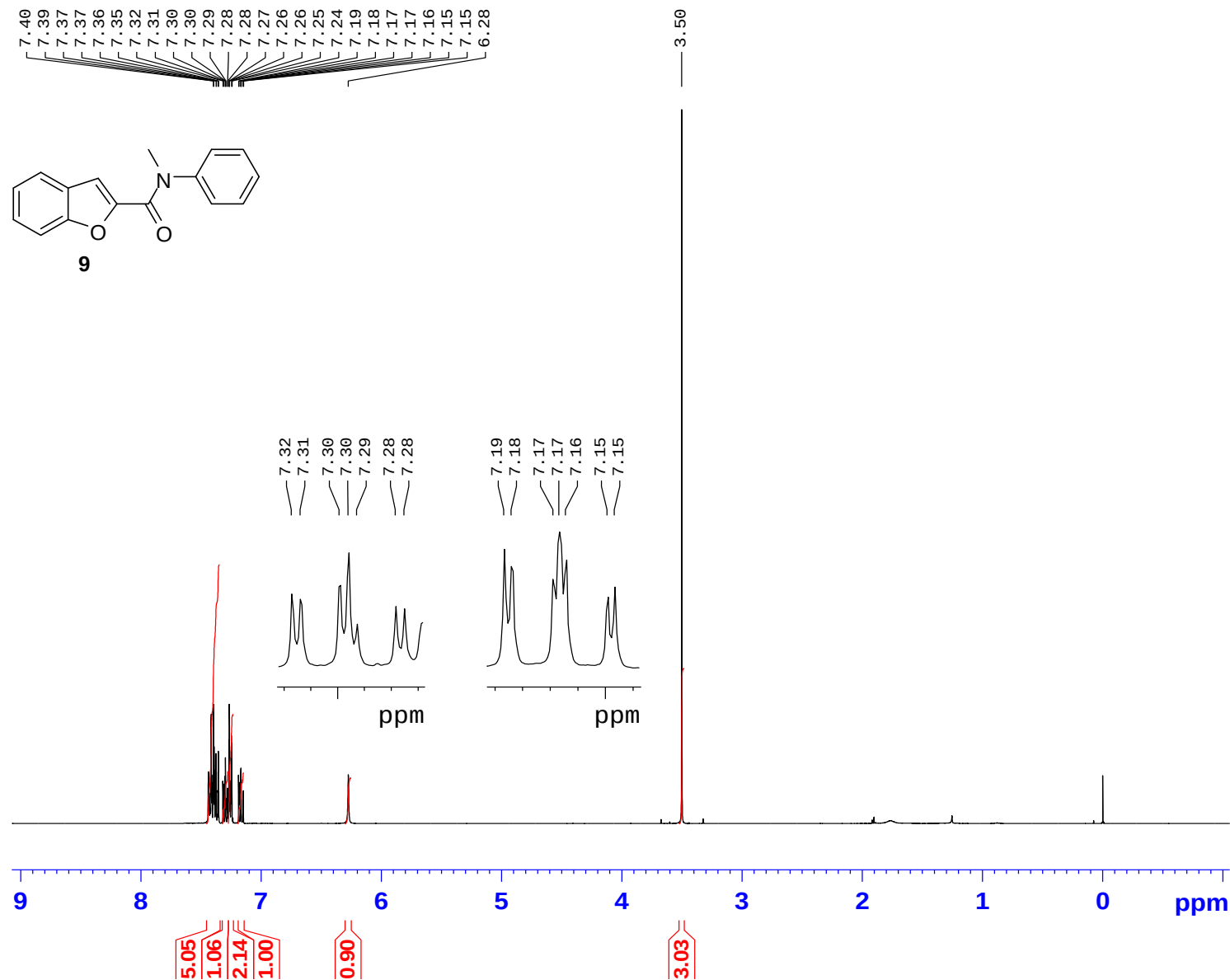
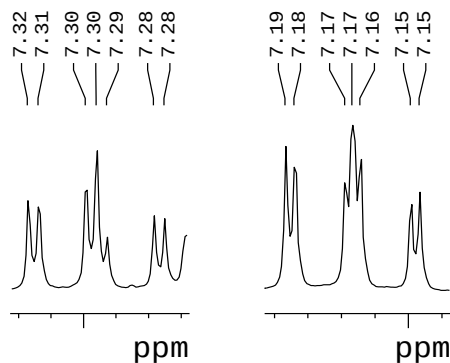
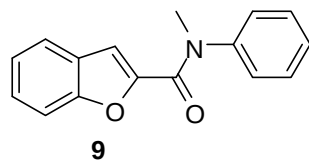
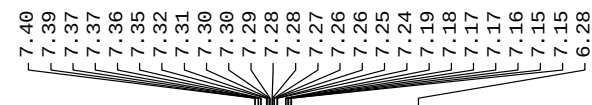
F2 - Acquisition Parameters
 Date_ 20131116
 Time 20.35
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 96
 DS 4
 SWH 26178.010 Hz
 FIDRES 0.399445 Hz
 AQ 1.2517875 sec
 RG 23170.5
 DW 19.100 usec
 DE 10.00 usec
 TE 295.5 K
 D1 2.00000000 sec
 d11 0.03000000 sec
 DELTA 1.89999998 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 13C
 P1 6.50 usec
 PL1 -4.00 dB
 SF01 100.6228292 MHz

===== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PL2 -4.00 dB
 PL12 11.78 dB
 PL13 18.75 dB
 SF02 400.1316005 MHz

F2 - Processing parameters
 SI 32768
 SF 100.6127690 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

DGP BA 1199



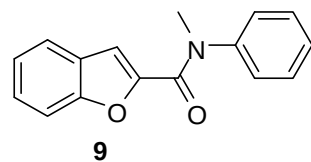
Current Data Parameters
NAME 20131108
EXPNO 630
PROCNO 1

F2 - Acquisition Parameters
Date_ 20131108
Time 21.29
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 181
DW 60.800 usec
DE 10.00 usec
TE 295.1 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

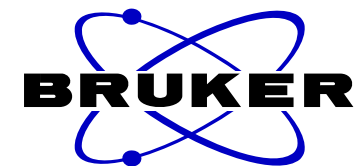
F2 - Processing parameters
SI 32768
SF 400.1300079 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00

DGP BA 1199



160.05
154.42
148.11
144.01
129.69
127.98
127.27
126.96
126.54
123.26
122.29
112.24
111.93

38.74



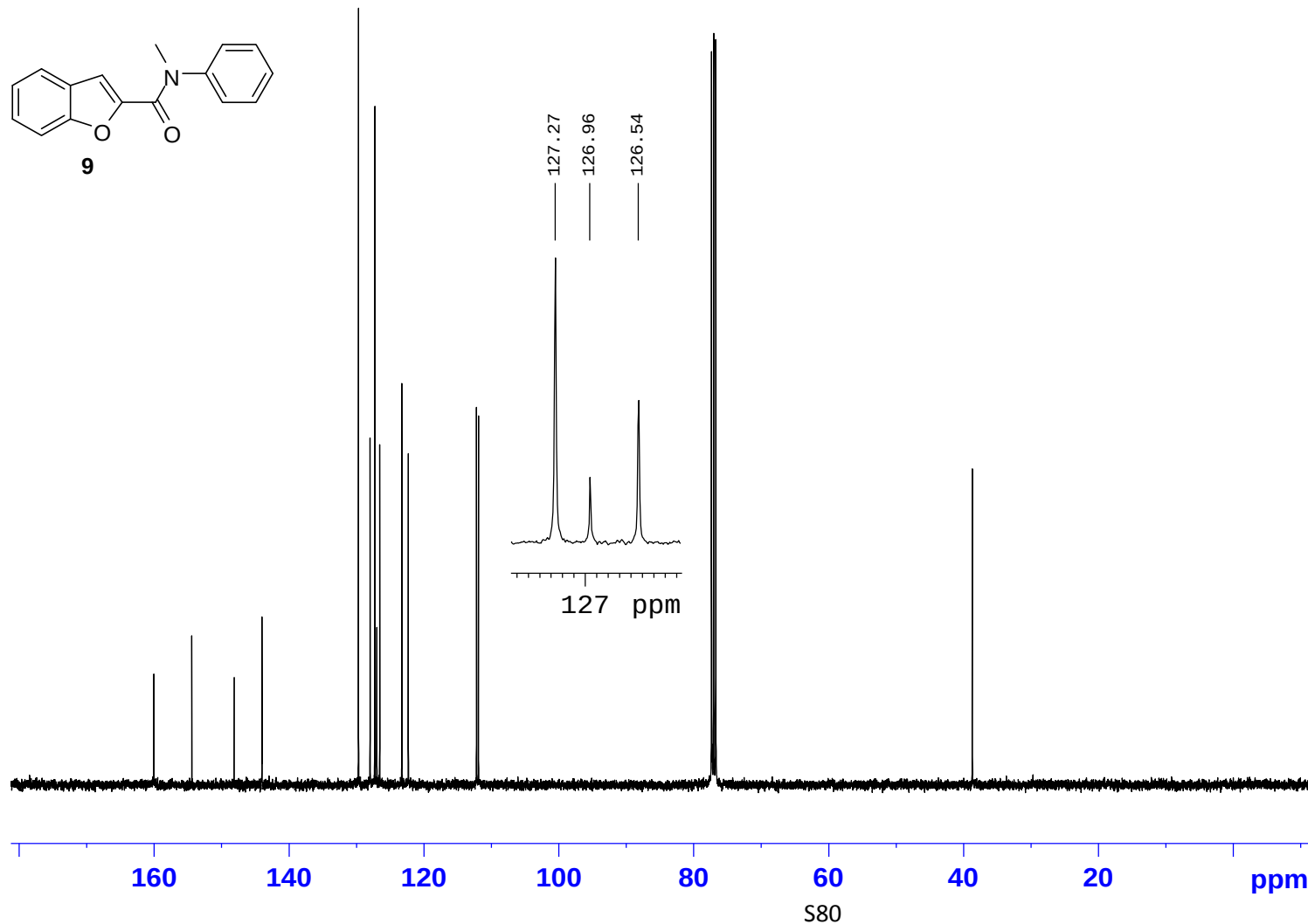
Current Data Parameters
NAME 20131112
EXPNO 650
PROCNO 1

F2 - Acquisition Parameters
Date_ 20131113
Time 6.11
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 512
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 26008
DW 19.100 usec
DE 10.00 usec
TE 295.7 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

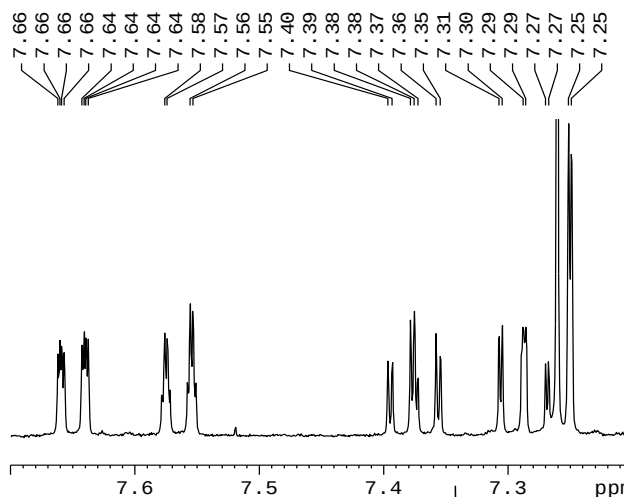
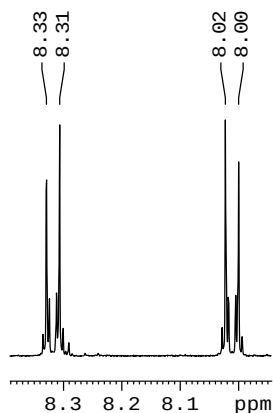
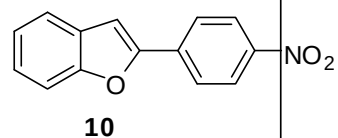
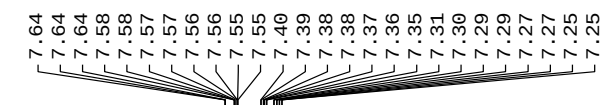
===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



DGP BA 1265

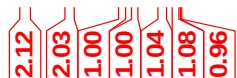


Current Data Parameters
NAME 20130627
EXPNO 420
PROCNO 1

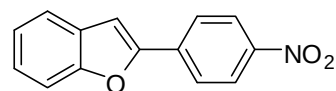
F2 - Acquisition Parameters
Date_ 20130627
Time 20.10
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 645.1
DW 60.800 usec
DE 10.00 usec
TE 295.4 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300094 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00

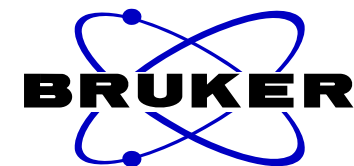
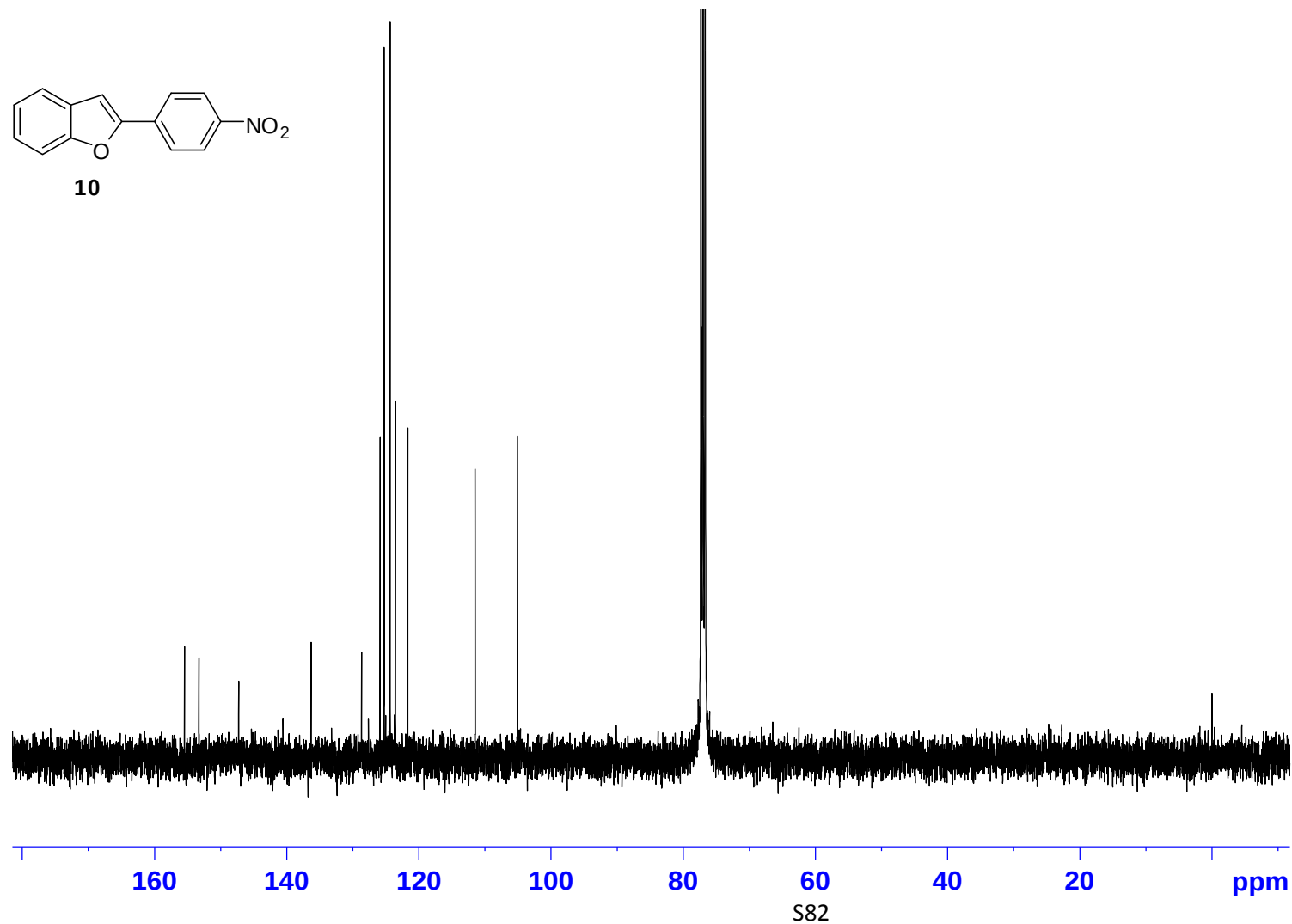


DGP BA 1265



10

155.45
153.26
147.25
136.30
128.66
125.84
125.24
124.34
123.56
121.65
111.52
105.13



Current Data Parameters
NAME 20131122
EXPNO 560
PROCNO 1

F2 - Acquisition Parameters

Date_ 20131123
Time 0.31
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 3000
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 23170.5
DW 19.100 usec
DE 10.00 usec
TE 300.0 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

===== CHANNEL f1 =====

NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

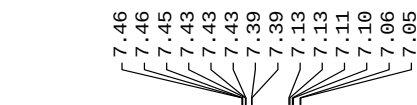
===== CHANNEL f2 =====

CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

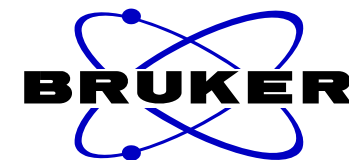
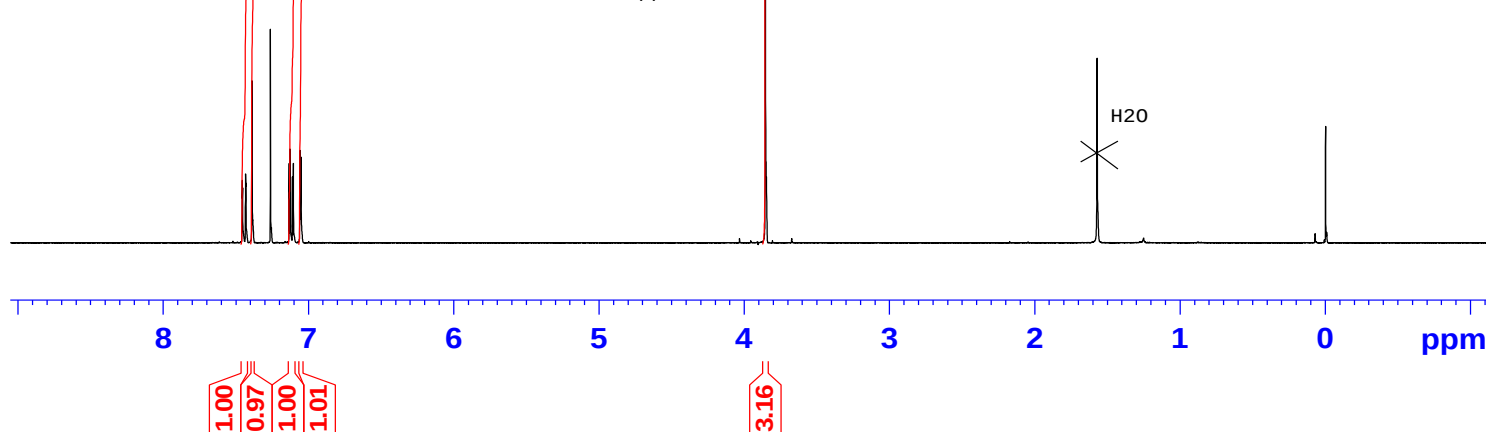
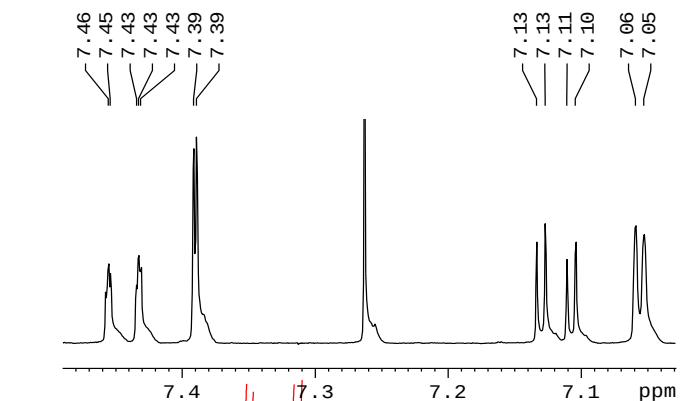
F2 - Processing parameters

SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

DGP BA 1175



13a



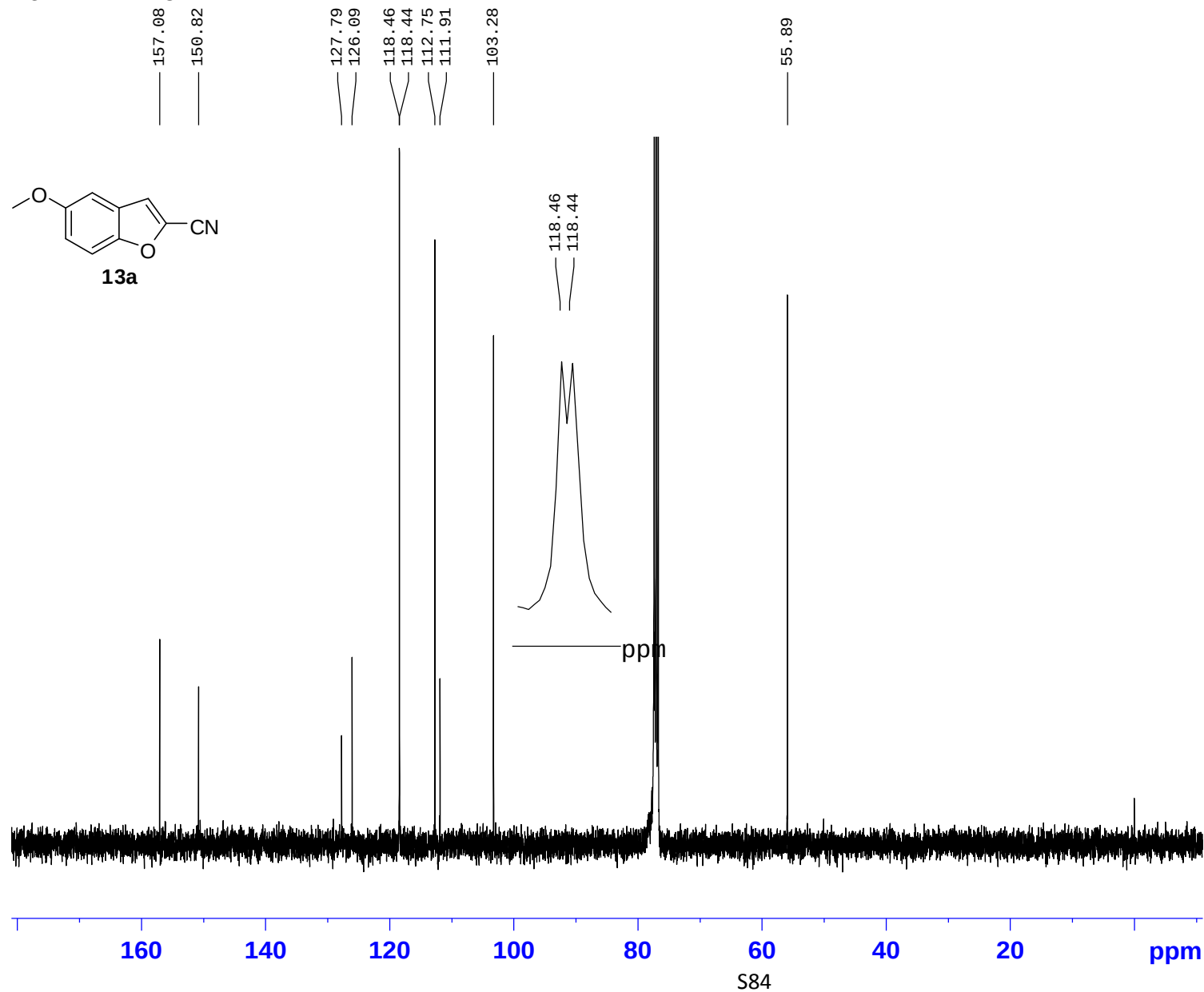
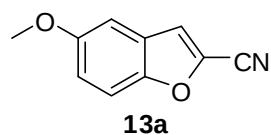
Current Data Parameters
 NAME 20131112
 EXPNO 40
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20131112
 Time 9.59
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.125483 Hz
 AQ 3.9846387 sec
 RG 512
 DW 60.800 usec
 DE 10.00 usec
 TE 294.5 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 10.50 usec
 PL1 -6.00 dB
 SF01 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300083 MHz
 WDW EM
 SSB 0
 LB 0.00 Hz
 GB 0
 PC 1.00

DGP BA 1175



Current Data Parameters
 NAME 20131115
 EXPNO 490
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20131116
 Time 8.12
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 1600
 DS 4
 SWH 26178.010 Hz
 FIDRES 0.399445 Hz
 AQ 1.2517875 sec
 RG 26008
 DW 19.100 usec
 DE 10.00 usec
 TE 295.5 K
 D1 2.00000000 sec
 d11 0.03000000 sec
 DELTA 1.89999998 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 13C
 P1 6.50 usec
 PL1 -4.00 dB
 SF01 100.6228292 MHz

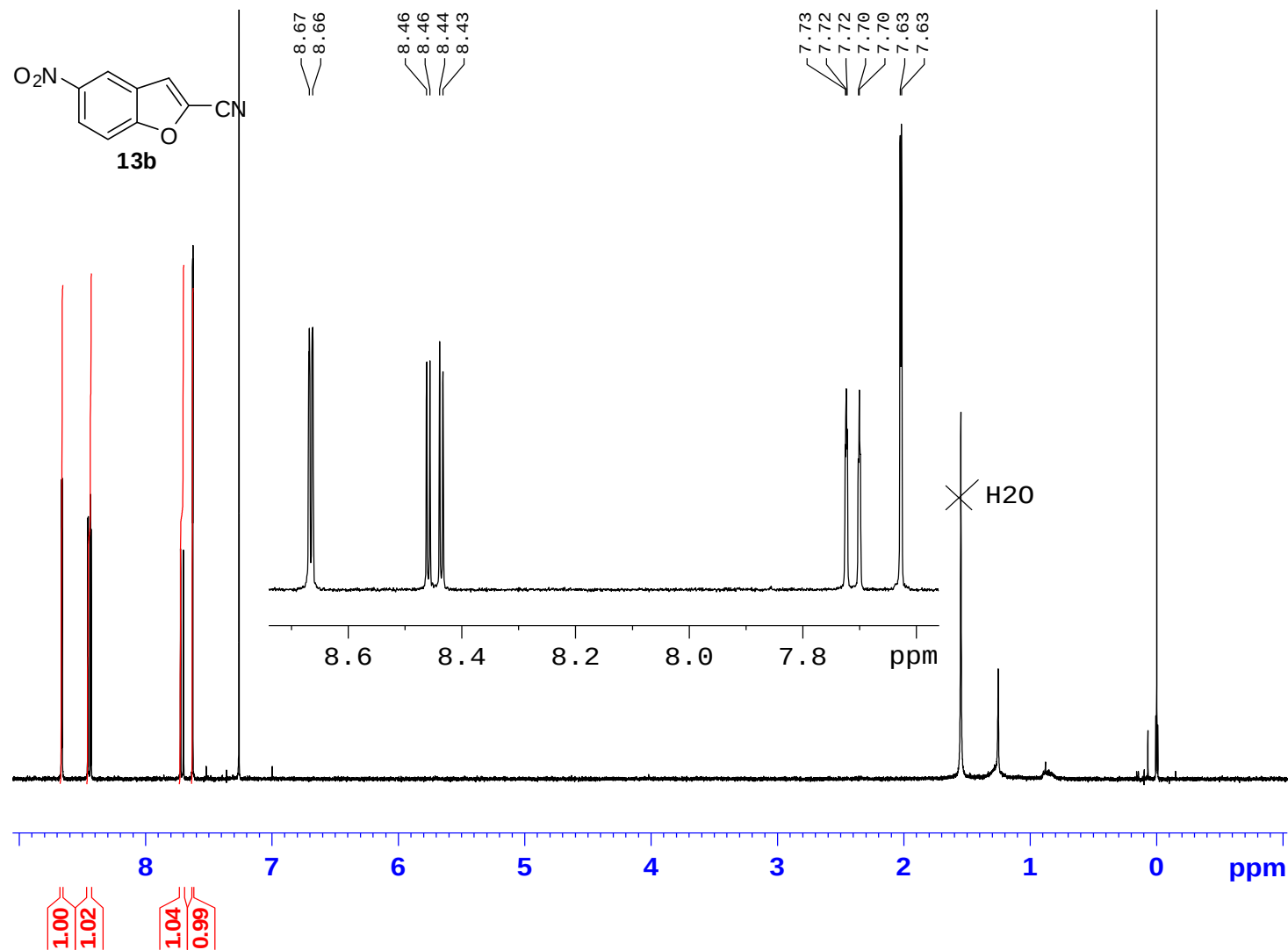
===== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PL2 -4.00 dB
 PL12 11.78 dB
 PL13 18.75 dB
 SF02 400.1316005 MHz

F2 - Processing parameters
 SI 32768
 SF 100.6127690 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

DGP BA 1160



13b



Current Data Parameters
 NAME 20130627
 EXPNO 330
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20130627
 Time 17.40
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.125483 Hz
 AQ 3.9846387 sec
 RG 645.1
 DW 60.800 usec
 DE 10.00 usec
 TE 295.6 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 10.50 usec
 PL1 -6.00 dB
 SF01 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300089 MHz
 WDW EM
 SSB 0
 LB 0.00 Hz
 GB 0
 PC 1.00

DGP BA 1160

157.82

145.34

130.45

125.91

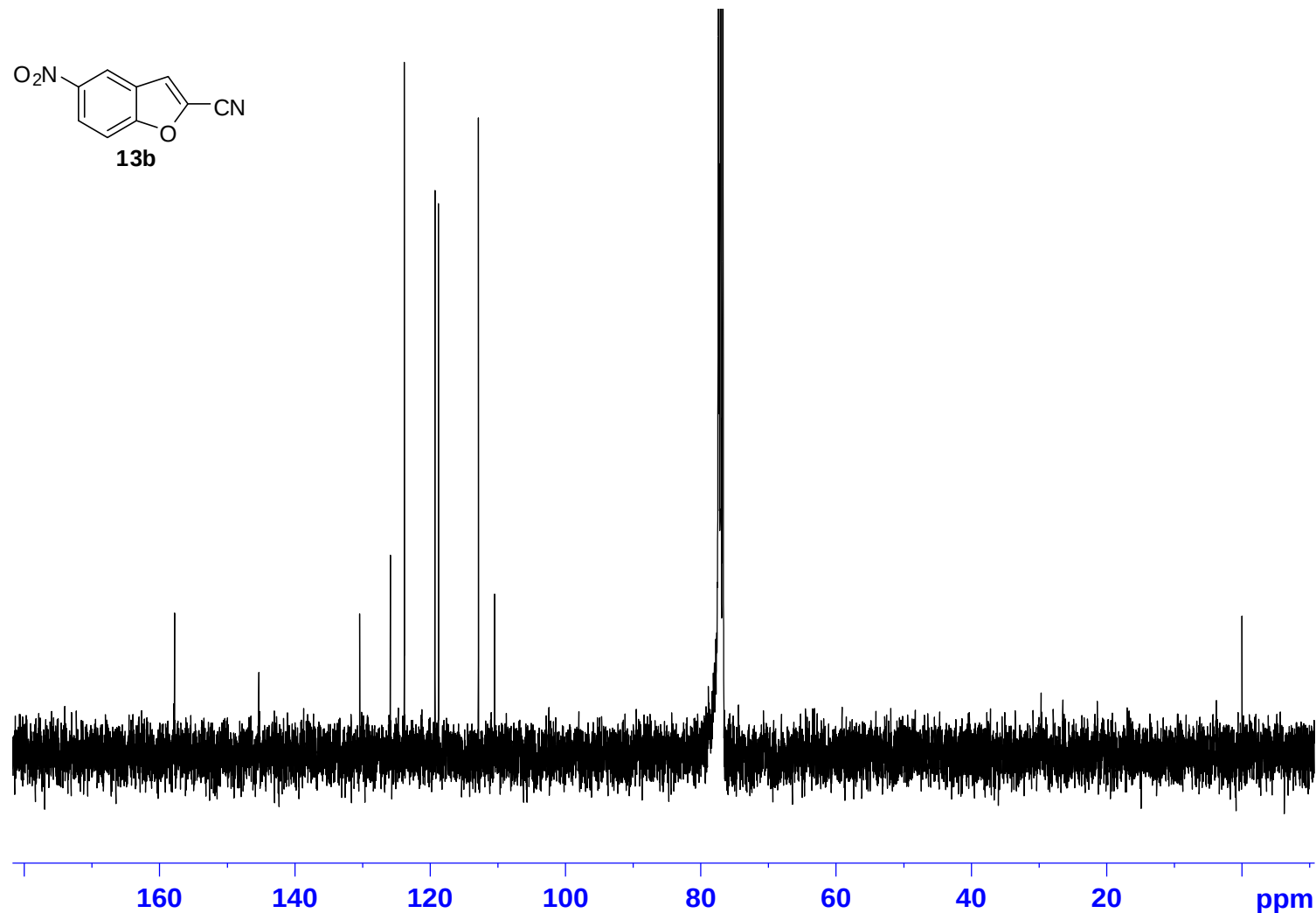
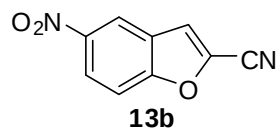
123.83

119.30

118.79

112.90

110.52



S86



Current Data Parameters
NAME 20131122
EXPNO 780
PROCNO 1

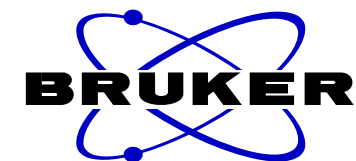
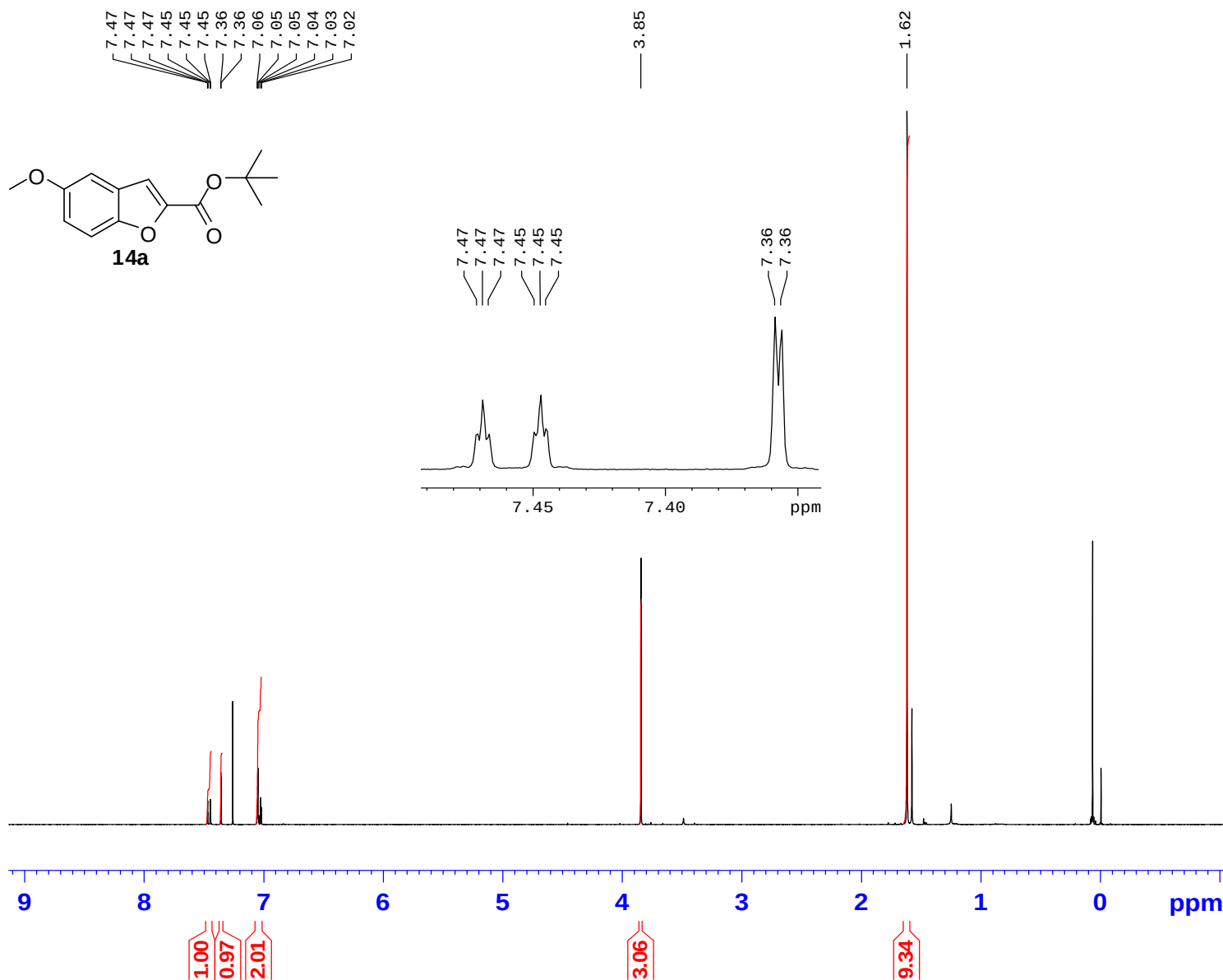
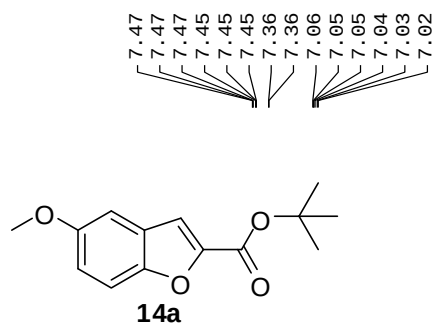
F2 - Acquisition Parameters
Date_ 20131125
Time 3.19
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 3000
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 26008
DW 19.100 usec
DE 10.00 usec
TE 295.7 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127699 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

DGP BA 1343



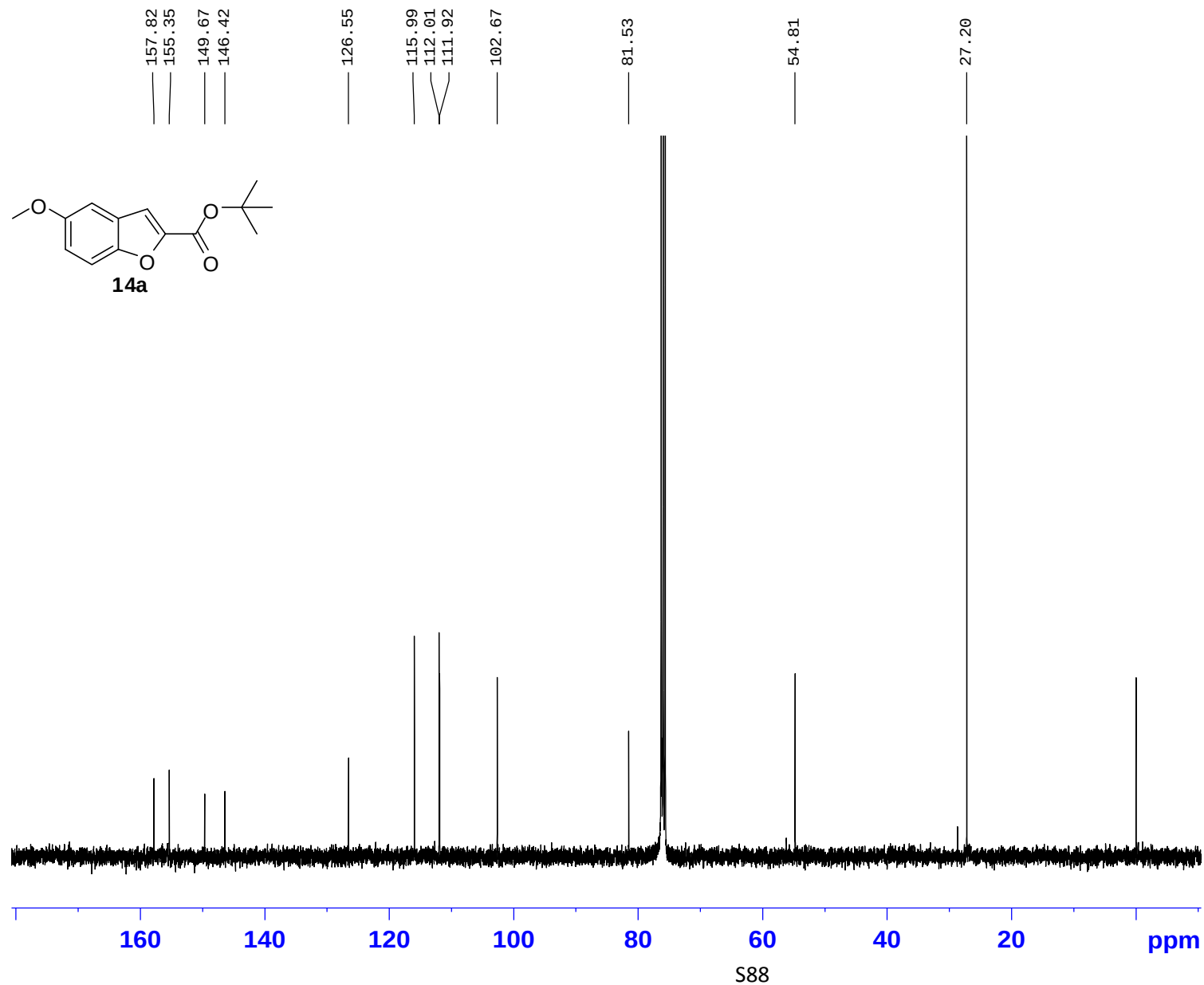
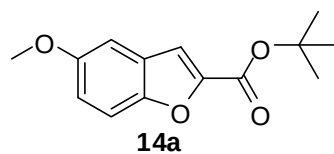
Current Data Parameters
NAME 20131112
EXPNO 520
PROCNO 1

F2 - Acquisition Parameters
Date_ 20131112
Time 20.18
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl₃
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 406.4
DW 60.800 usec
DE 10.00 usec
TE 300.0 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300094 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00

DGP BA 1343



Current Data Parameters
NAME 20131115
EXPNO 570
PROCNO 1

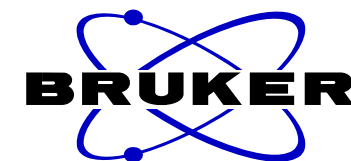
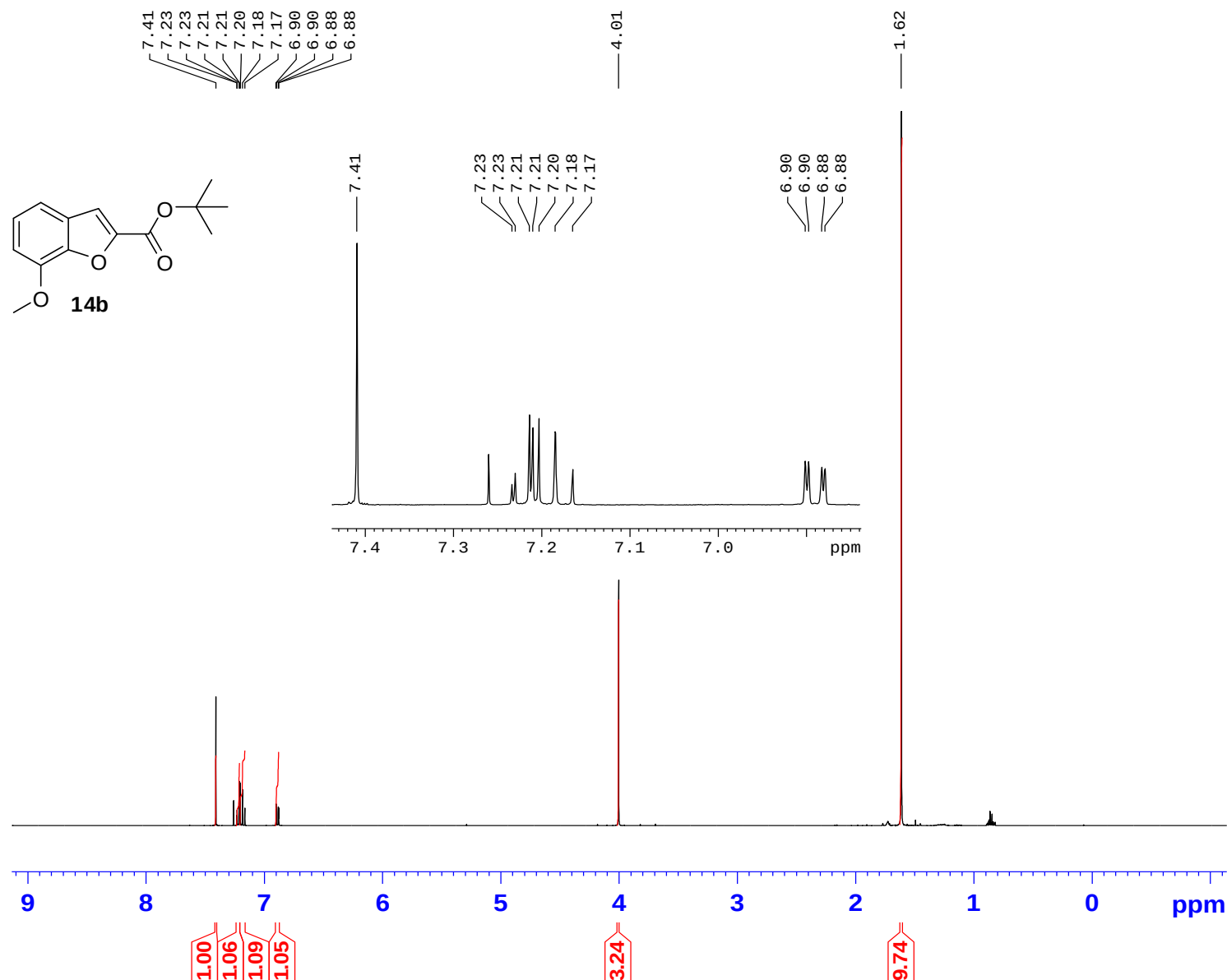
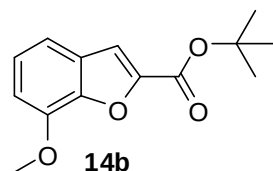
F2 - Acquisition Parameters
Date_ 20131117
Time 0.12
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1200
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 29193
DW 19.100 usec
DE 10.00 usec
TE 295.4 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6128732 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

BA 1263



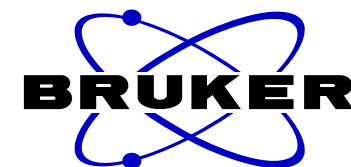
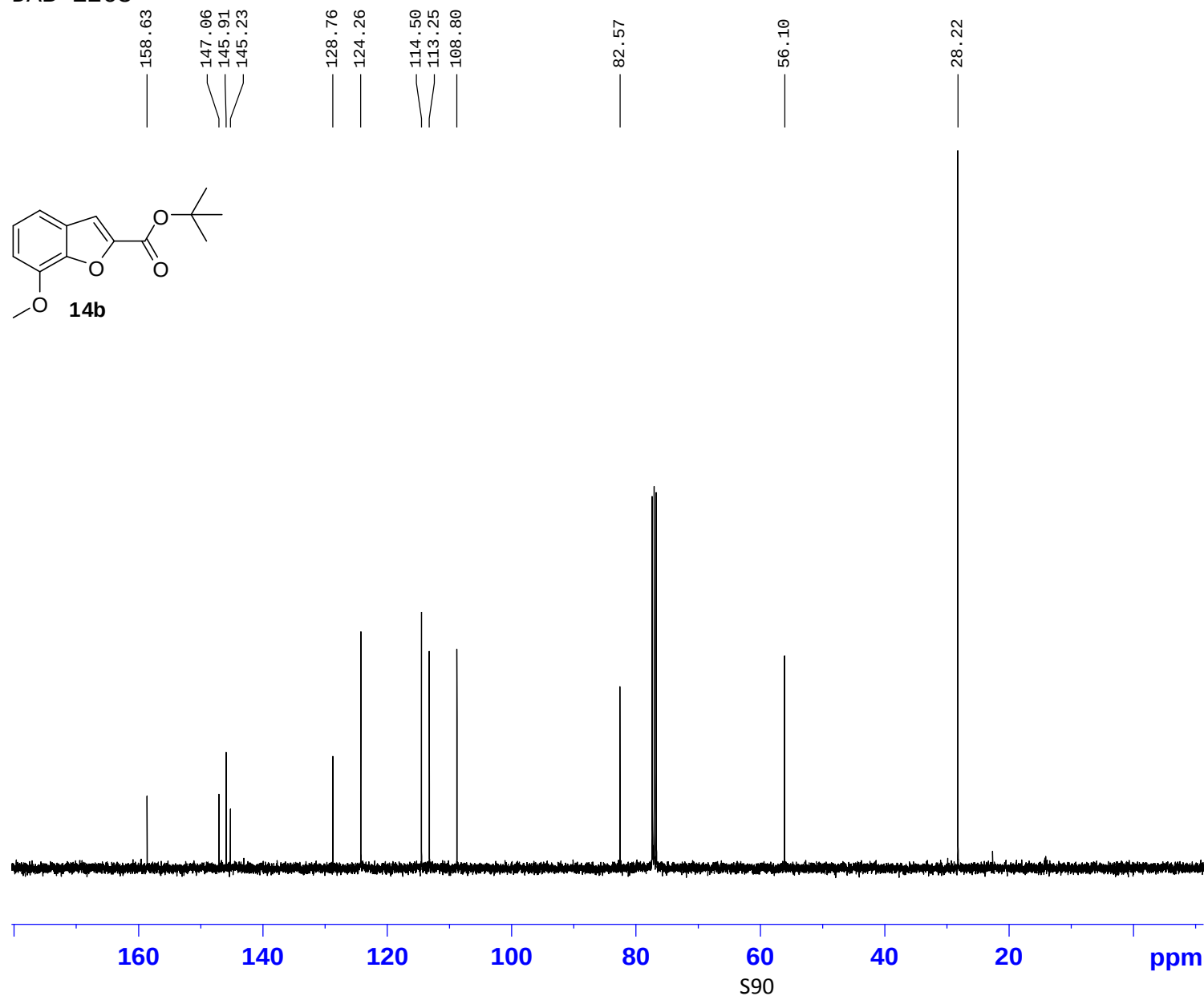
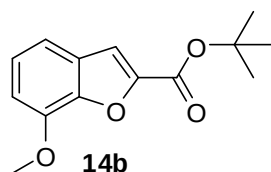
Current Data Parameters
 NAME 20120712
 EXPNO 570
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20120712
 Time 19.26
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.125483 Hz
 AQ 3.9846387 sec
 RG 128
 DW 60.800 usec
 DE 10.00 usec
 TE 296.1 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 10.50 usec
 PL1 -6.00 dB
 SF01 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300094 MHz
 WDW EM
 SSB 0
 LB 0.00 Hz
 GB 0
 PC 1.00

DAB 1263



Current Data Parameters
NAME 20120713
EXPNO 440
PROCNO 1

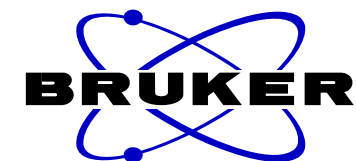
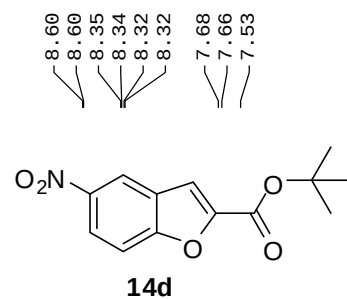
F2 - Acquisition Parameters
Date_ 20120713
Time 21.42
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 128
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 29193
DW 19.100 usec
DE 10.00 usec
TE 296.8 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

BA 1161

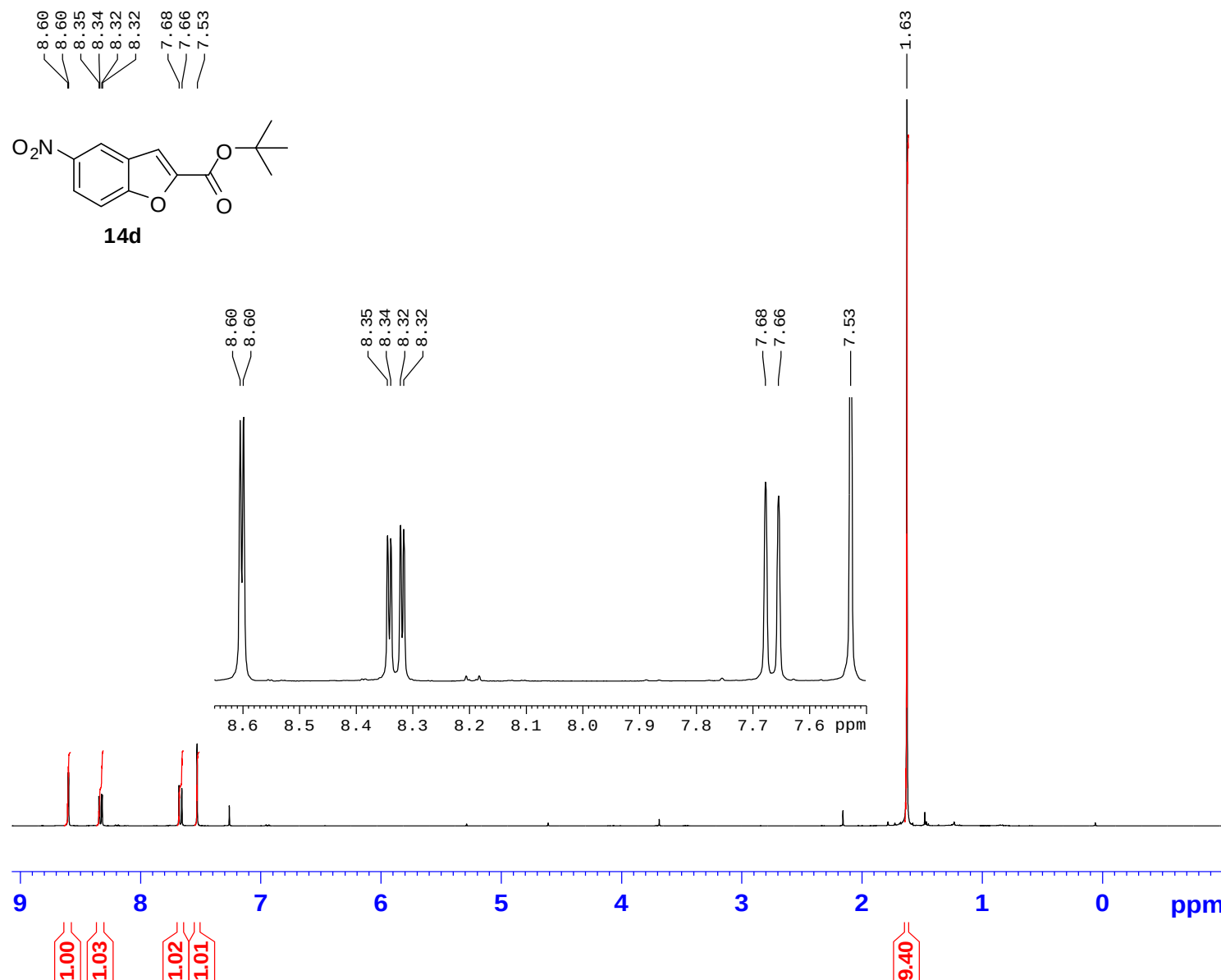


Current Data Parameters
 NAME 20120423
 EXPNO 182
 PROCNO 1

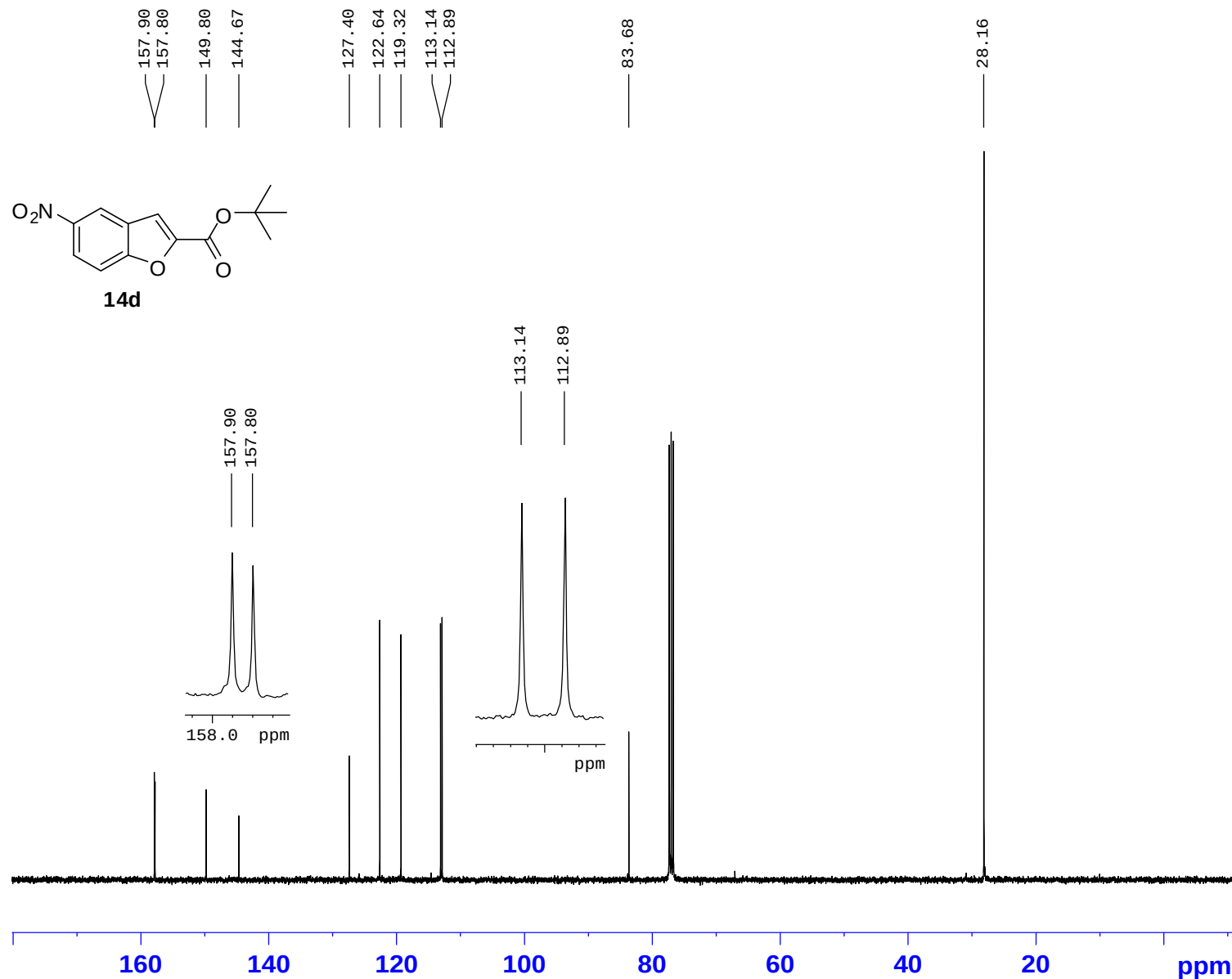
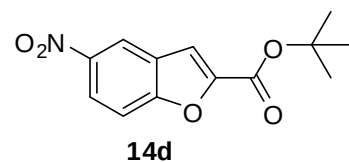
F2 - Acquisition Parameters
 Date_ 20120424
 Time 5.56
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 8278.146 Hz
 FIDRES 0.126314 Hz
 AQ 3.9584243 sec
 RG 101.6
 DW 60.400 usec
 DE 10.00 usec
 TE 295.7 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 10.50 usec
 PL1 -6.00 dB
 SF01 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300093 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00



BA 1161



Current Data Parameters
 NAME 20120423
 EXPNO 180
 PROCNO 1

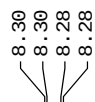
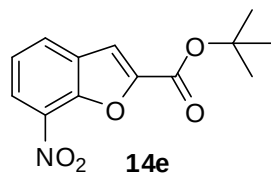
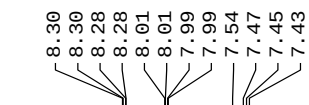
F2 - Acquisition Parameters
 Date_ 20120424
 Time 5.37
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 512
 DS 4
 SWH 26178.010 Hz
 FIDRES 0.399445 Hz
 AQ 1.2517875 sec
 RG 26008
 DW 19.100 usec
 DE 10.00 usec
 TE 300.0 K
 D1 2.00000000 sec
 d11 0.03000000 sec
 DELTA 1.89999998 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 13C
 P1 6.50 usec
 PL1 -4.00 dB
 SF01 100.6228292 MHz

===== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PL2 -4.00 dB
 PL12 11.78 dB
 PL13 18.75 dB
 SF02 400.1316005 MHz

F2 - Processing parameters
 SI 32768
 SF 100.6127690 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

DGP BA 1257



7.54



1.65

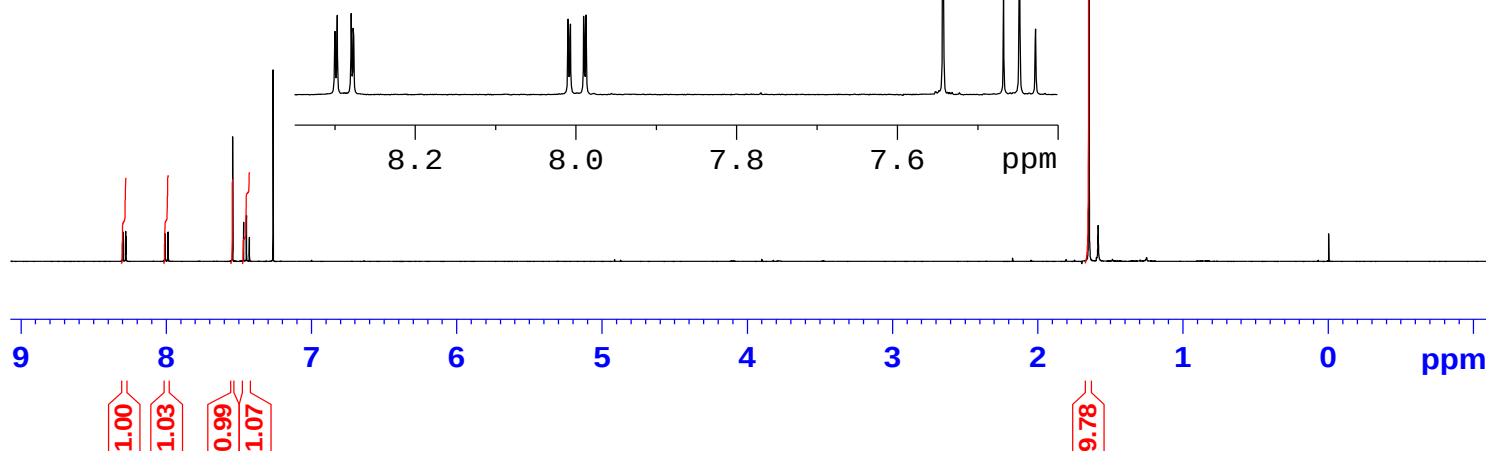


Current Data Parameters
NAME 20131204
EXPNO 180
PROCNO 1

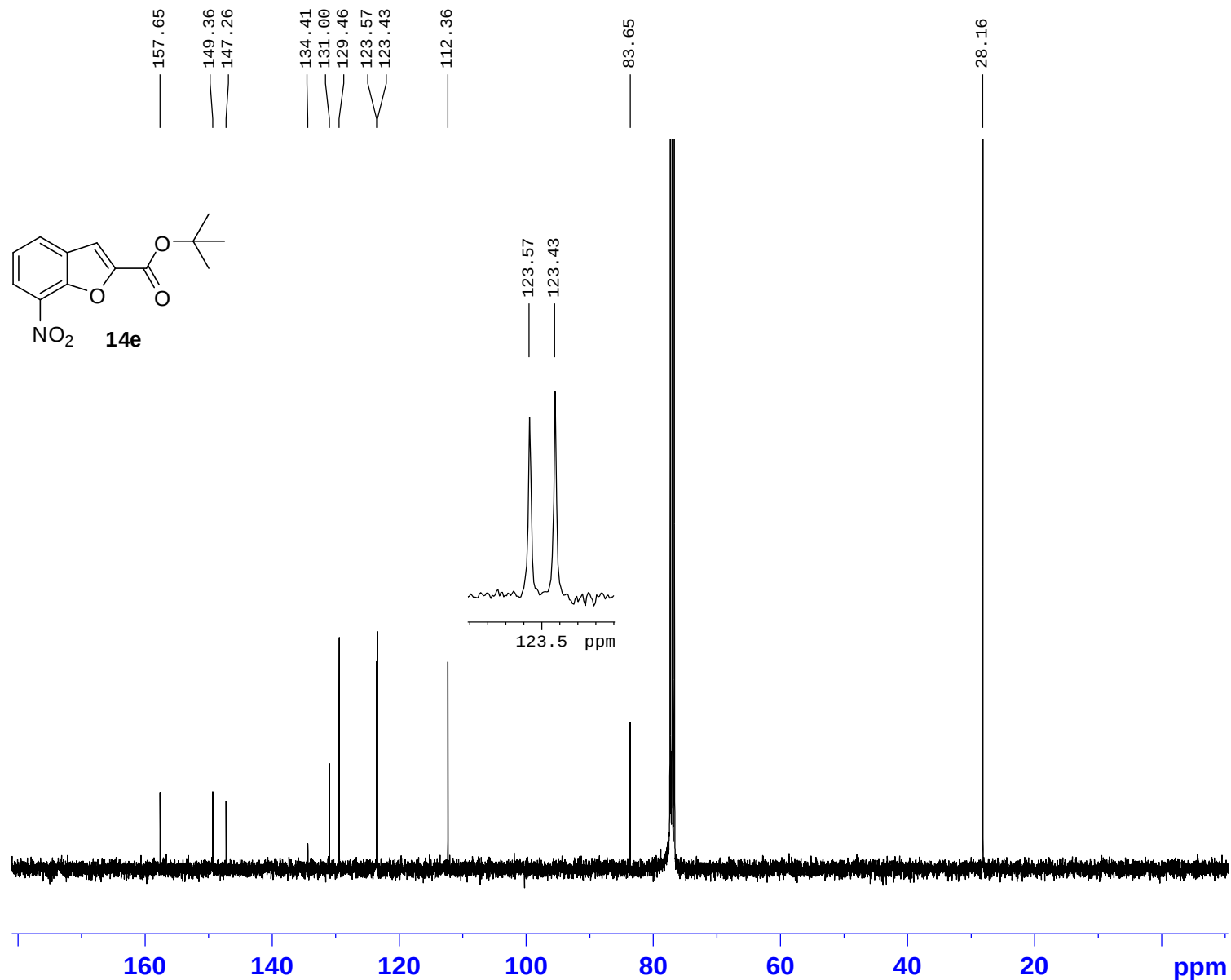
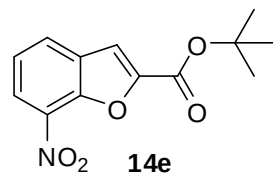
F2 - Acquisition Parameters
Date_ 20131204
Time 12.47
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 456.1
DW 60.800 usec
DE 10.00 usec
TE 300.0 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300082 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00



DGP BA 1257



Current Data Parameters
 NAME 20131206
 EXPNO 740
 PROCNO 1

F2 - Acquisition Parameters

Date_ 20131207
 Time 16.39
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 1400
 DS 4
 SWH 26178.010 Hz
 FIDRES 0.399445 Hz
 AQ 1.2517875 sec
 RG 26008
 DW 19.100 usec
 DE 10.00 usec
 TE 300.0 K
 D1 2.00000000 sec
 d11 0.03000000 sec
 DELTA 1.89999998 sec
 TD0 1

===== CHANNEL f1 =====

NUC1 13C
 P1 6.50 usec
 PL1 -4.00 dB
 SF01 100.6228292 MHz

===== CHANNEL f2 =====

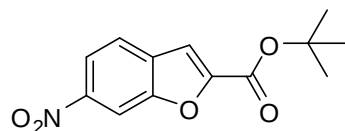
CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PL2 -4.00 dB
 PL12 11.78 dB
 PL13 18.75 dB
 SF02 400.1316005 MHz

F2 - Processing parameters

SI 32768
 SF 100.6127690 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

DGP BA 1256

8.49
8.48
8.48
8.48
8.24
8.23
8.22
8.21
7.81
7.78
7.78
7.50
7.50



14f

8.49
8.48
8.48
8.48

8.24
8.23
8.22
8.21

7.81
7.78
7.78

7.50
7.50

1.64

1.64

H2O

8.4 8.2 8.0 7.8 7.6 ppm

1.6 ppm

9 8 7 6 5 4 3 2 1 0 ppm

1.00
1.09
1.10
1.04

9.66



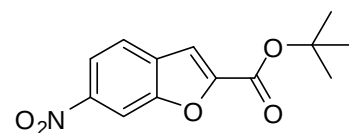
Current Data Parameters
NAME 20131113
EXPNO 30
PROCNO 1

F2 - Acquisition Parameters
Date_ 20131113
Time 10.15
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 512
DW 60.800 usec
DE 10.00 usec
TE 294.7 K
D1 1.00000000 sec
TD0 1

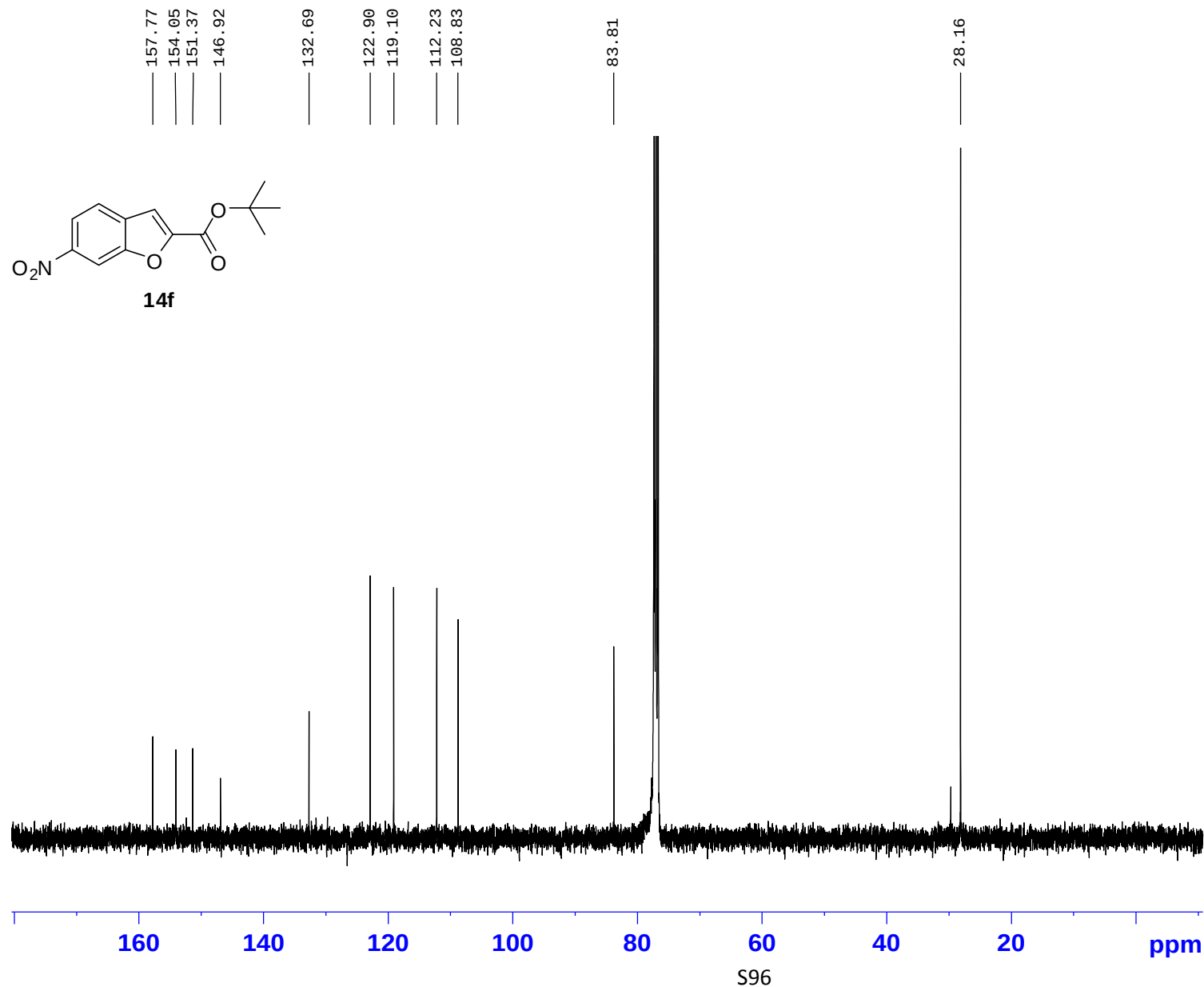
===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300080 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00

DGP BA 1256



14f



Current Data Parameters
NAME 20131122
EXPNO 660
PROCNO 1

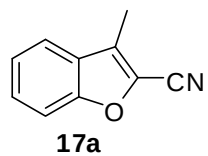
F2 - Acquisition Parameters
Date_ 20131124
Time 5.12
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 4000
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 23170.5
DW 19.100 usec
DE 10.00 usec
TE 295.3 K
D1 4.00000000 sec
d11 0.03000000 sec
DELTA 3.90000010 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

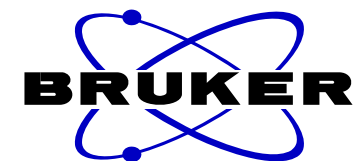
F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

BA 1060



7.54
7.52
7.51
7.42
7.30
7.29
7.28
7.27
7.26

2.39

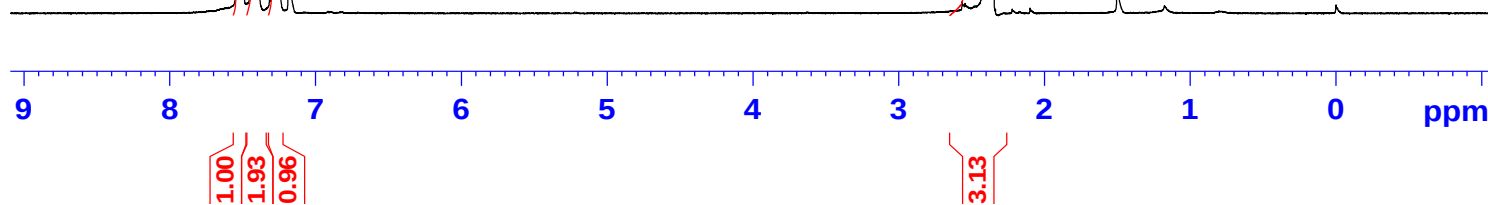


Current Data Parameters
NAME 20120203
EXPNO 674
PROCNO 1

F2 - Acquisition Parameters
Date_ 20120205
Time 9.26
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 287.4
DW 60.800 usec
DE 10.00 usec
TE 293.4 K
D1 1.00000000 sec
TD0 1

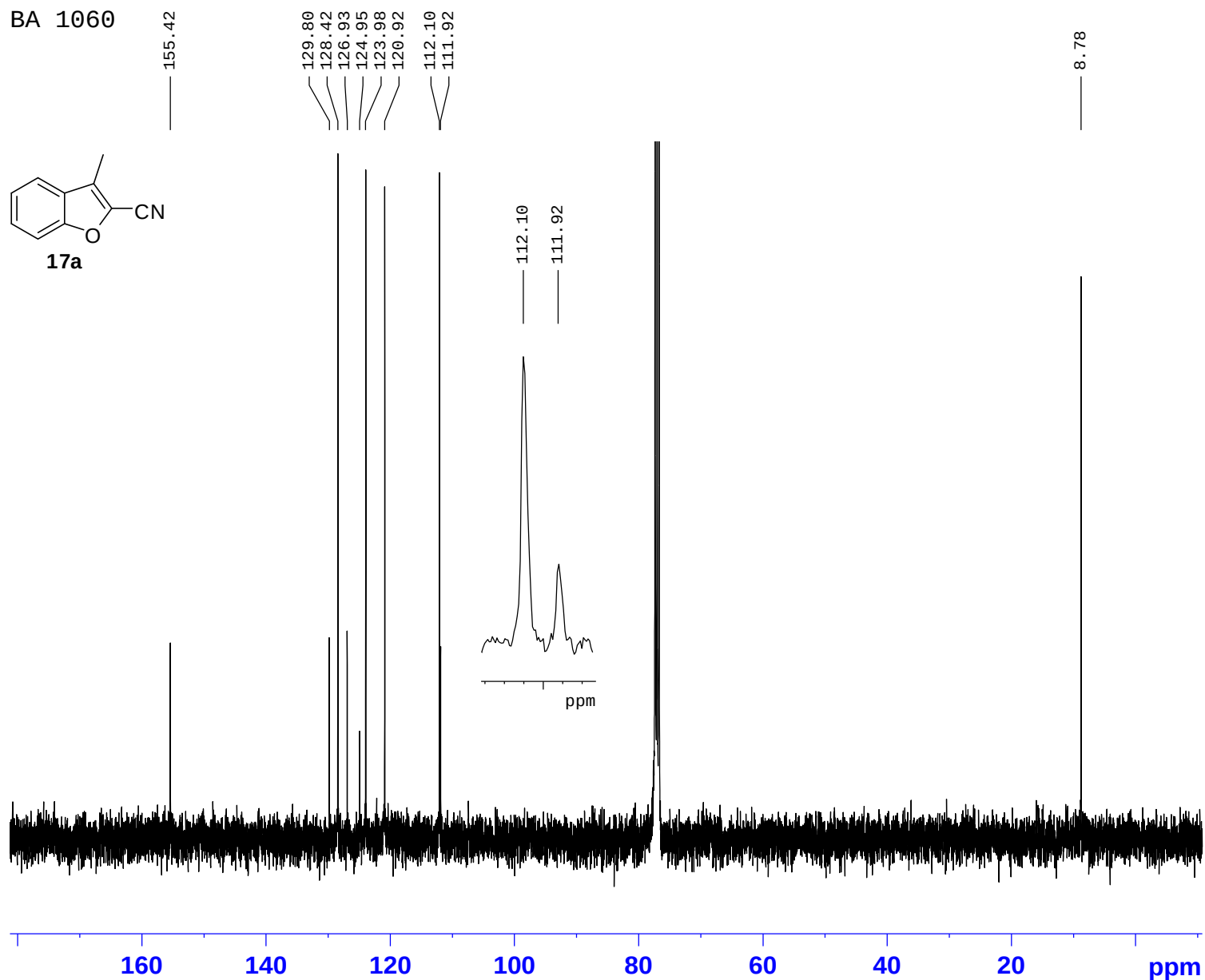
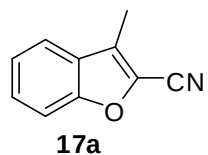
===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300431 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00



S97

BA 1060



Current Data Parameters
NAME 20120203
EXPNO 670
PROCNO 1

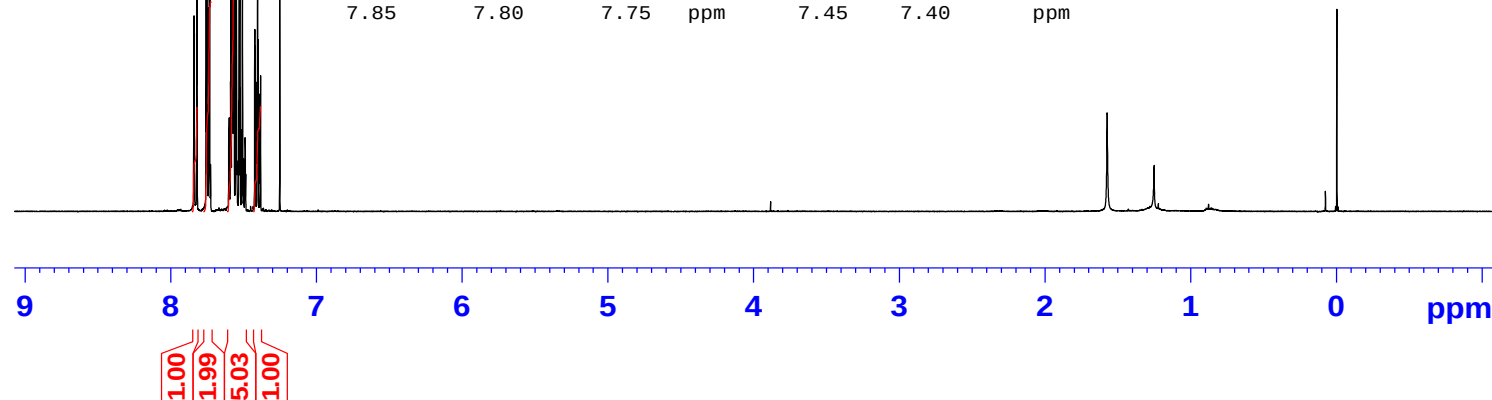
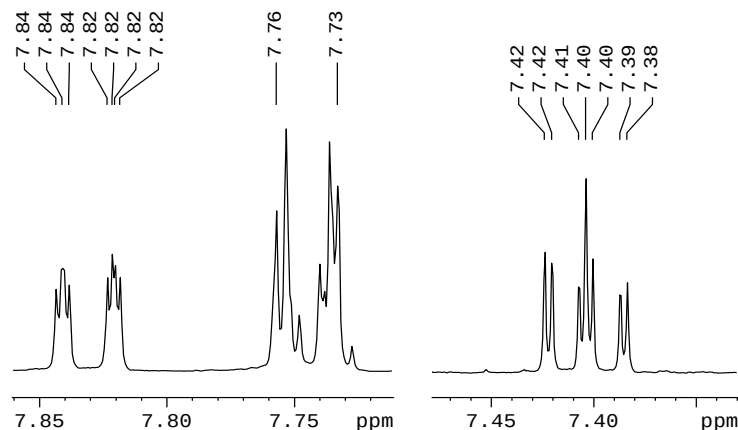
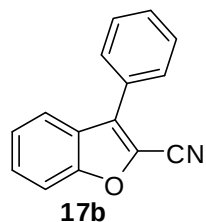
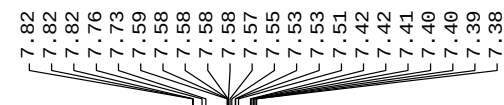
F2 - Acquisition Parameters
Date_ 20120205
Time 8.59
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 512
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 26008
DW 19.100 usec
DE 10.00 usec
TE 294.0 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

DGP BA 1071



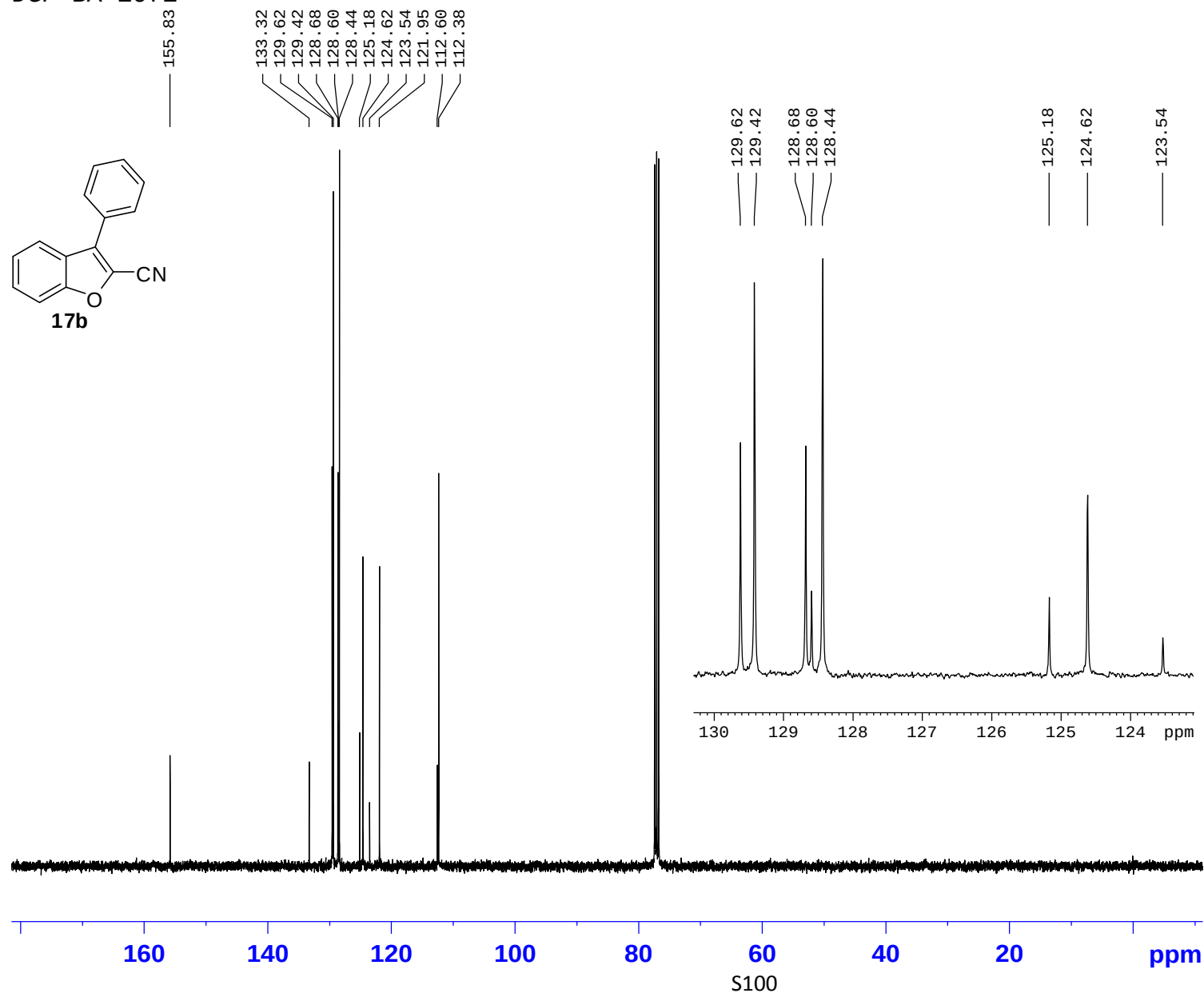
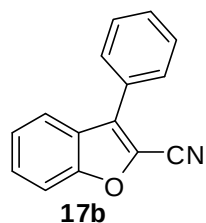
Current Data Parameters
 NAME 20131108
 EXPNO 500
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20131108
 Time 18.42
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.125483 Hz
 AQ 3.9846387 sec
 RG 181
 DW 60.800 usec
 DE 10.00 usec
 TE 295.3 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 10.50 usec
 PL1 -6.00 dB
 SF01 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300124 MHz
 WDW EM
 SSB 0
 LB 0.00 Hz
 GB 0
 PC 1.00

DGP BA 1071



Current Data Parameters
NAME 20131113
EXPNO 470
PROCNO 1

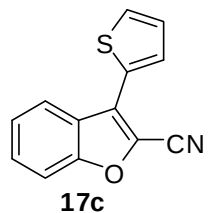
F2 - Acquisition Parameters
Date_ 20131114
Time 4.39
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 512
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 20642.5
DW 19.100 usec
DE 10.00 usec
TE 295.7 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

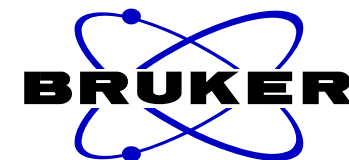
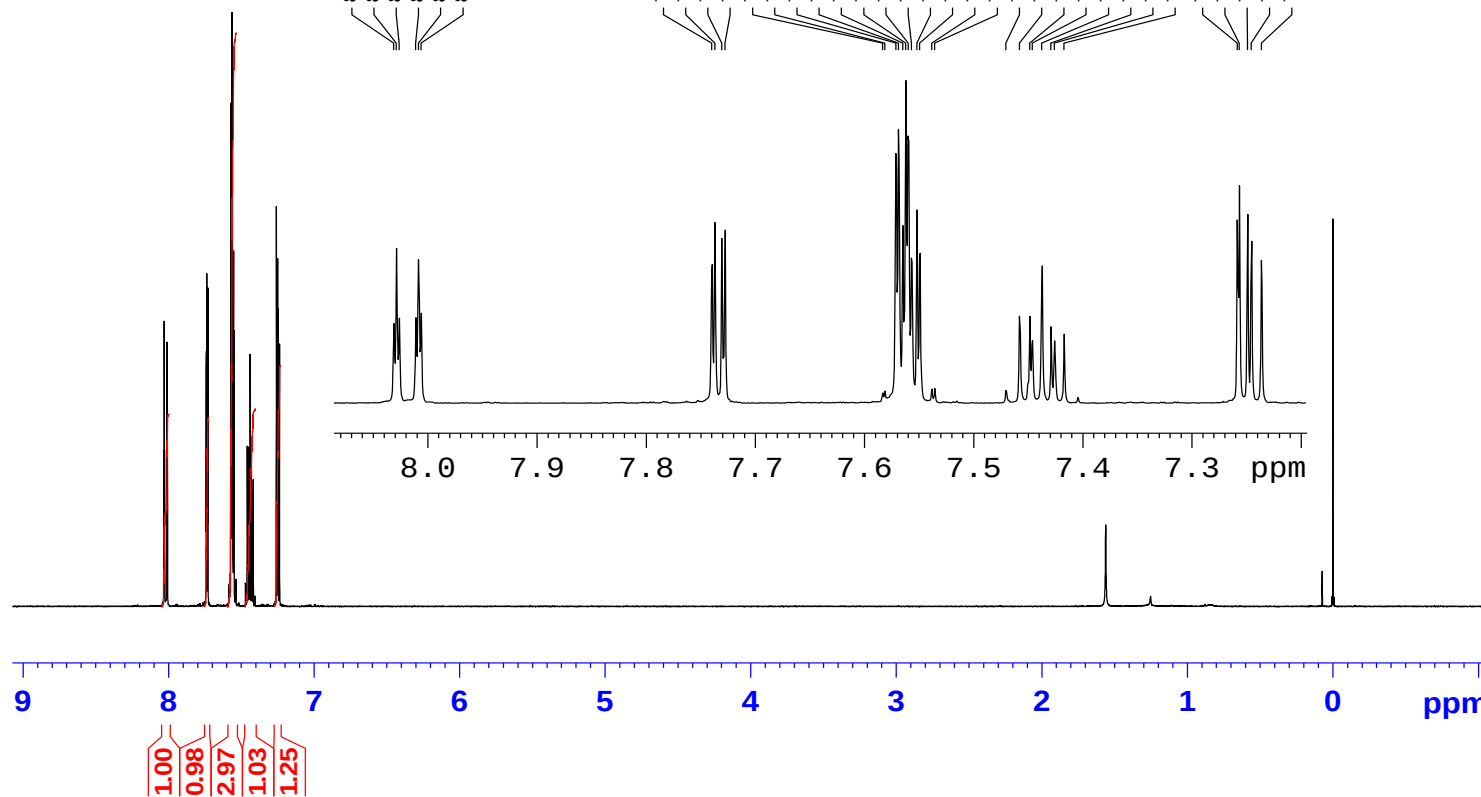
DGP BA 1136



7.73
7.58
7.58
7.57
7.56
7.56
7.56
7.55
7.55
7.54
7.54
7.47
7.46
7.45
7.45
7.43
7.43
7.42
7.26
7.26
7.25
7.24

8.03
8.03
8.01
8.01
8.01

7.74
7.74
7.73
7.73
7.58
7.58
7.57
7.57
7.56
7.56
7.56
7.55
7.55
7.54
7.54
7.47
7.46
7.45
7.45
7.44
7.43
7.43
7.42
7.26
7.26
7.25
7.25
7.24



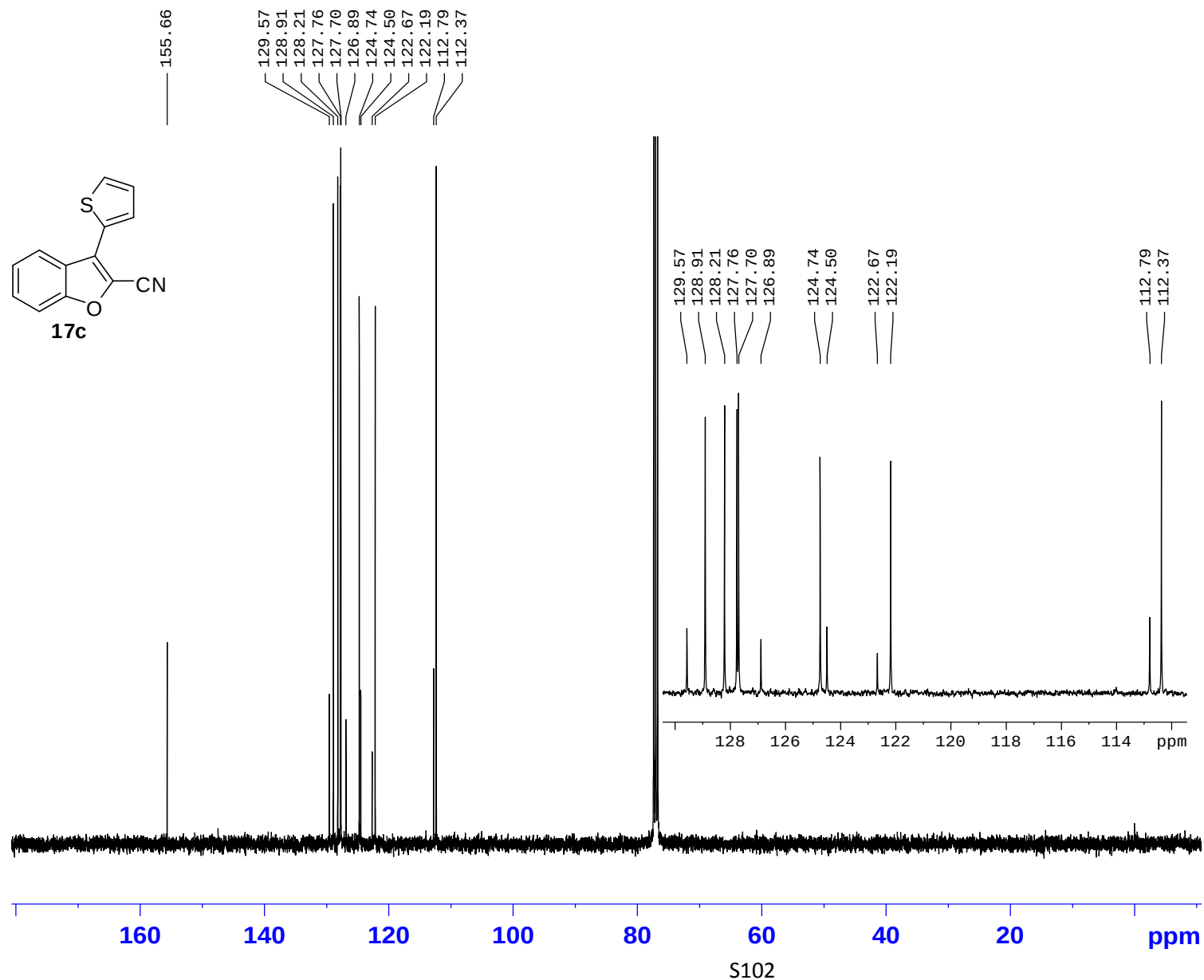
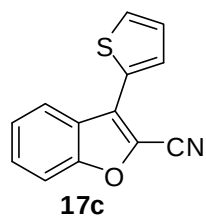
Current Data Parameters
NAME 20130627
EXPNO 240
PROCNO 1

F2 - Acquisition Parameters
Date_ 20130627
Time 16.13
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 362
DW 60.800 usec
DE 10.00 usec
TE 295.5 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300110 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00

DGP BA 1136



Current Data Parameters
 NAME 20131122
 EXPNO 630
 PROCNO 1

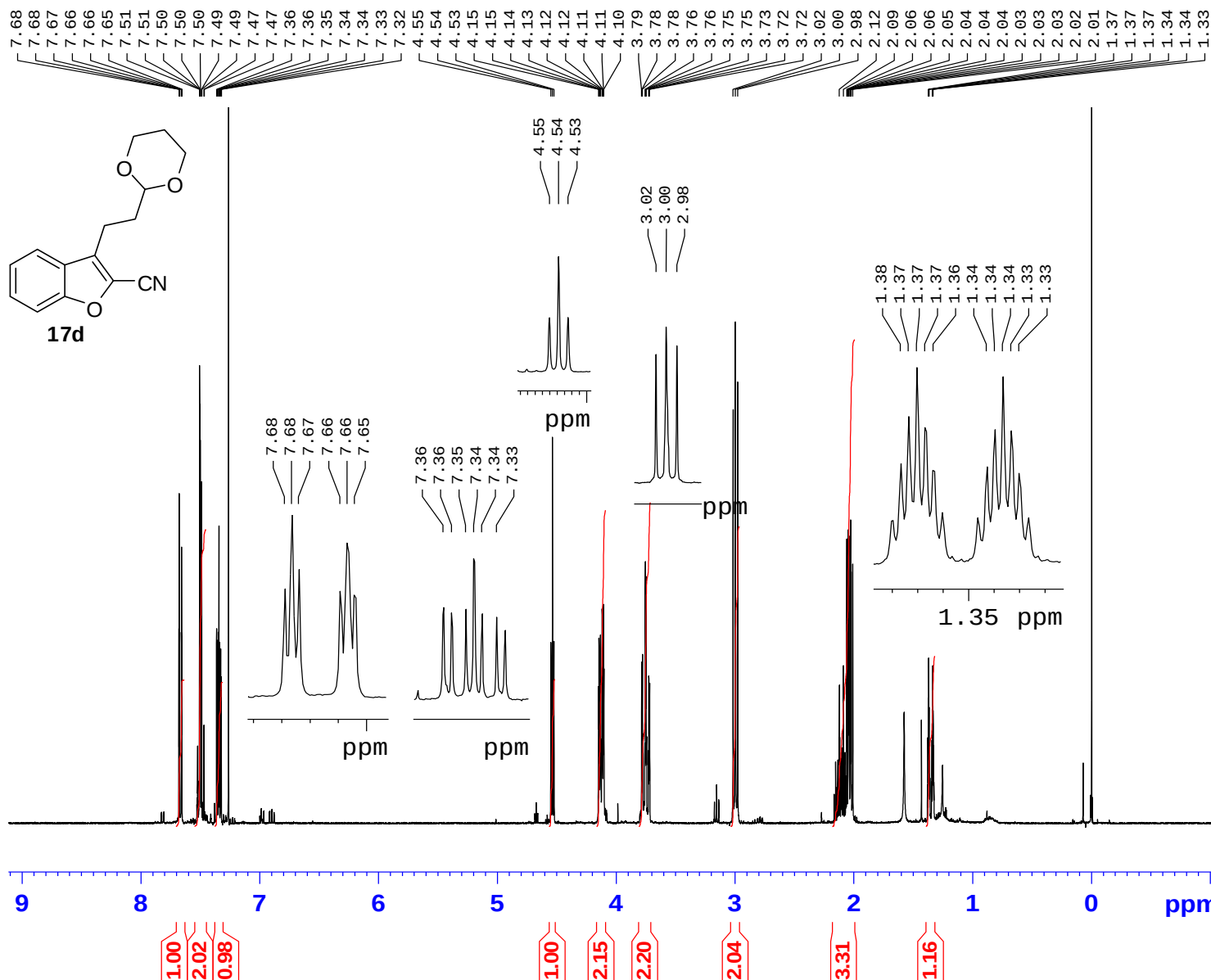
F2 - Acquisition Parameters
 Date_ 20131123
 Time 12.55
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 1000
 DS 4
 SWH 26178.010 Hz
 FIDRES 0.399445 Hz
 AQ 1.2517875 sec
 RG 29193
 DW 19.100 usec
 DE 10.00 usec
 TE 300.0 K
 D1 2.00000000 sec
 d11 0.03000000 sec
 DELTA 1.89999998 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 13C
 P1 6.50 usec
 PL1 -4.00 dB
 SF01 100.6228292 MHz

===== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PL2 -4.00 dB
 PL12 11.78 dB
 PL13 18.75 dB
 SF02 400.1316005 MHz

F2 - Processing parameters
 SI 32768
 SF 100.6127690 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

DGP BA 1138



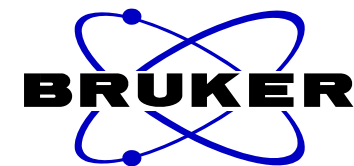
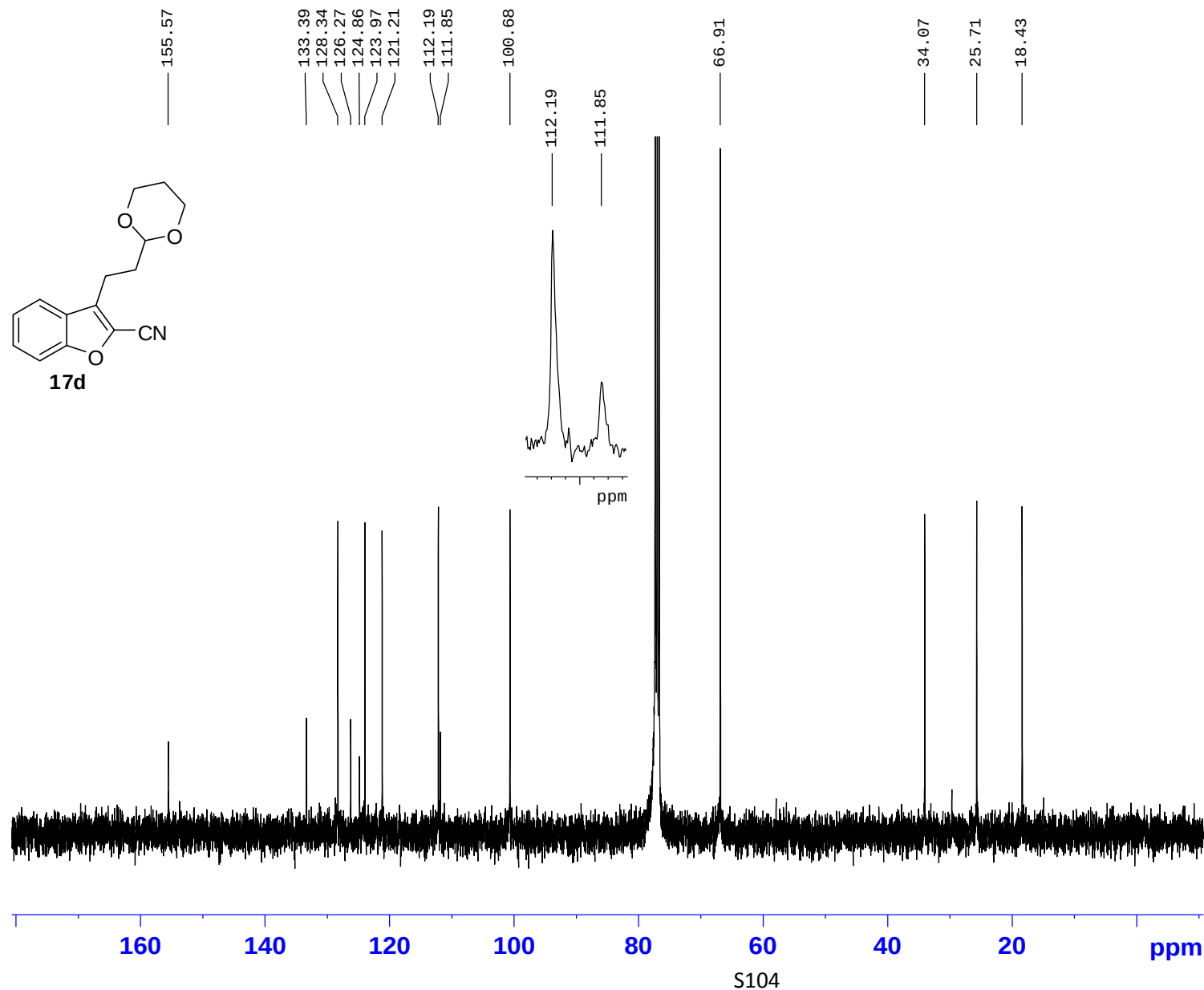
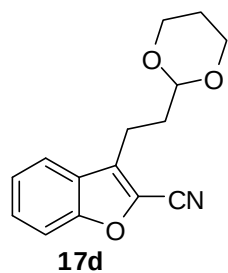
Current Data Parameters
 NAME 20130627
 EXPNO 440
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20130627
 Time 20.25
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.125483 Hz
 AQ 3.9846387 sec
 RG 362
 DW 60.800 usec
 DE 10.00 usec
 TE 295.4 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 10.50 usec
 PL1 -6.00 dB
 SF01 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300089 MHz
 WDW EM
 SSB 0
 LB 0.00 Hz
 GB 0
 PC 1.00

DGP BA 1138



Current Data Parameters
 NAME 20131126
 EXPNO 710
 PROCNO 1

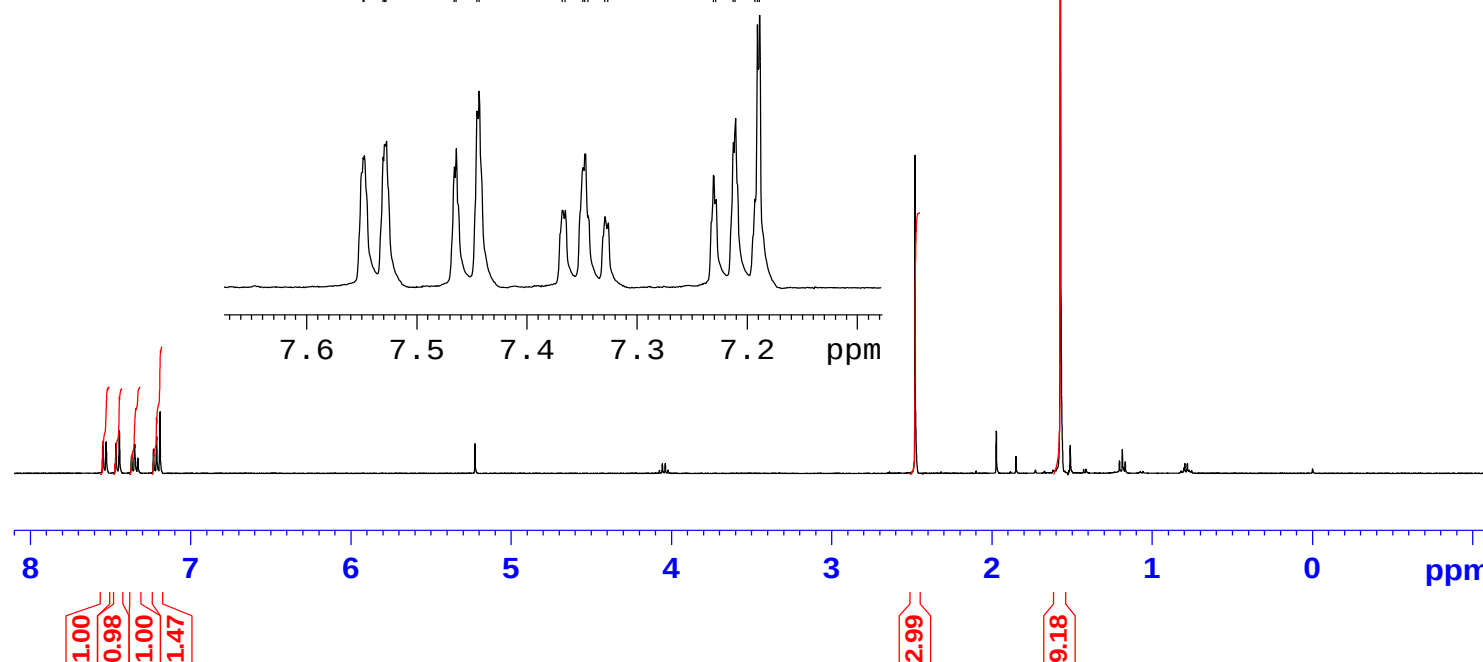
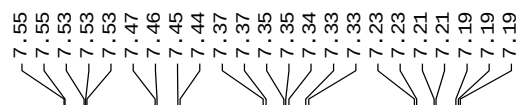
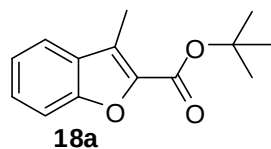
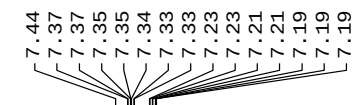
F2 - Acquisition Parameters
 Date_ 20131127
 Time 8.51
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl₃
 NS 1000
 DS 4
 SWH 26178.010 Hz
 FIDRES 0.399445 Hz
 AQ 1.2517875 sec
 RG 26008
 DW 19.100 usec
 DE 10.00 usec
 TE 300.0 K
 D1 2.00000000 sec
 d11 0.03000000 sec
 DELTA 1.89999998 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 13C
 P1 6.50 usec
 PL1 -4.00 dB
 SF01 100.6228292 MHz

===== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PL2 -4.00 dB
 PL12 11.78 dB
 PL13 18.75 dB
 SF02 400.1316005 MHz

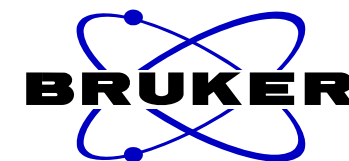
F2 - Processing parameters
 SI 32768
 SF 100.6127690 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

BA 1061



— 2.48

— 1.57



Current Data Parameters
NAME 20120203
EXPNO 710
PROCNO 1

F2 - Acquisition Parameters
Date_ 20120206
Time 4.22
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 181
DW 60.800 usec
DE 10.00 usec
TE 293.7 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300381 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00

S105

BA 1061

159.92

154.19

141.95

129.25

127.38

124.27

122.94

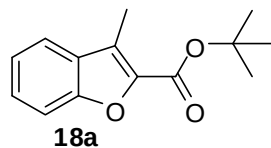
120.97

112.16

82.36

28.38

9.52



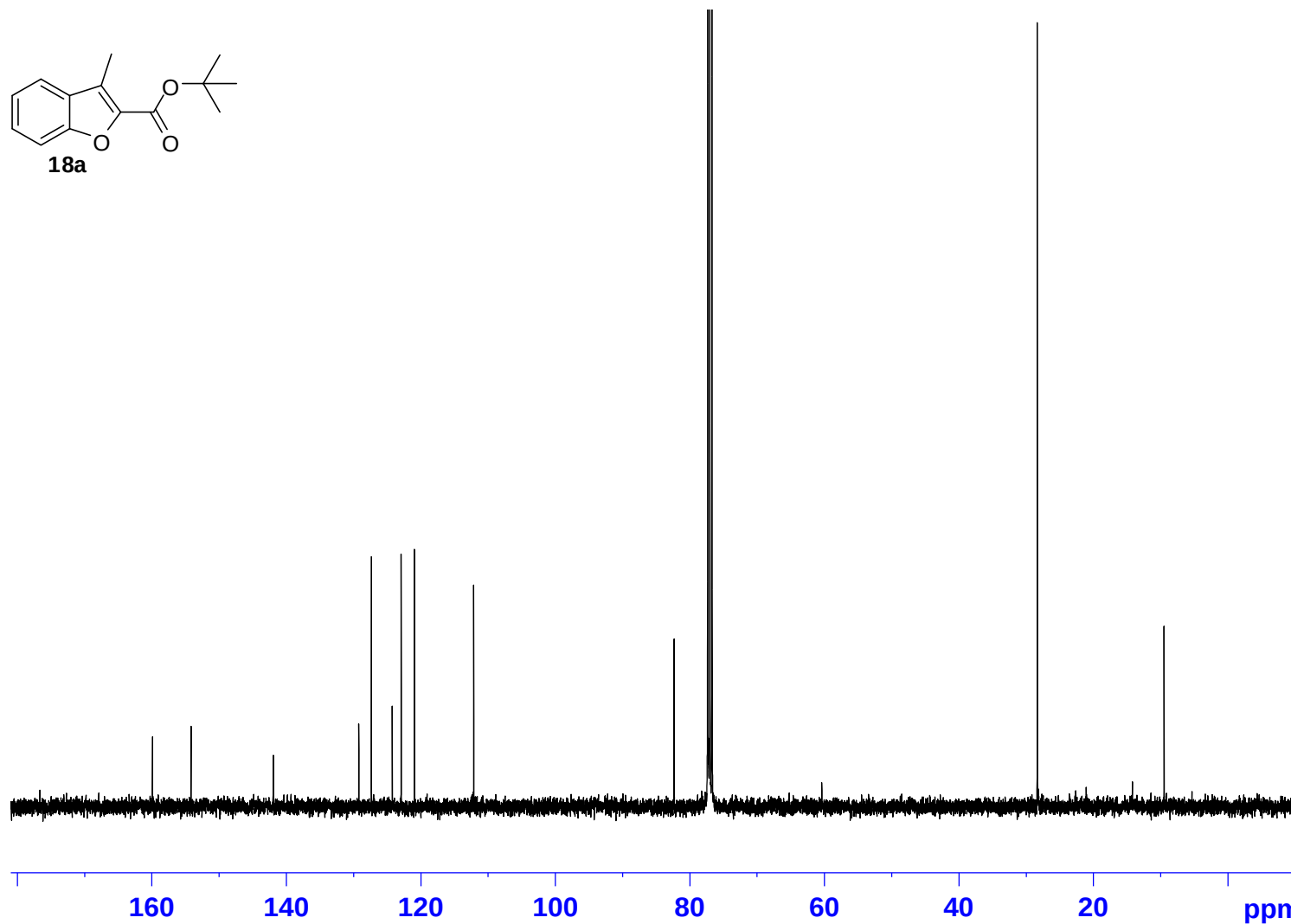
Current Data Parameters
NAME 20120203
EXPNO 711
PROCNO 1

F2 - Acquisition Parameters
Date_ 20120206
Time 4.52
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 512
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 29193
DW 19.100 usec
DE 10.00 usec
TE 294.3 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

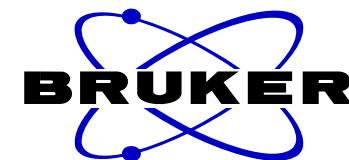
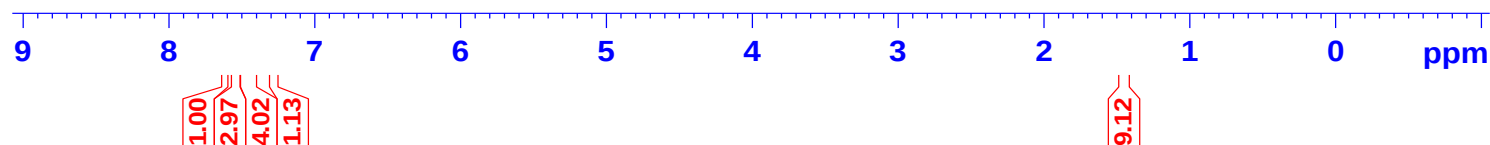
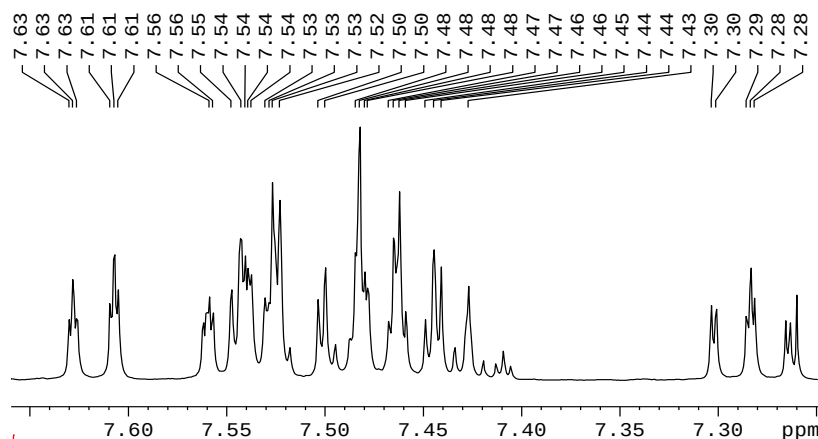
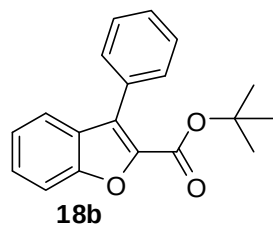
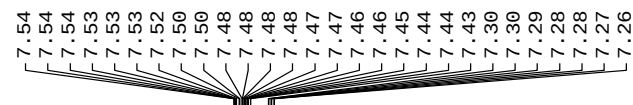
===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



S106

JF 1001 F1



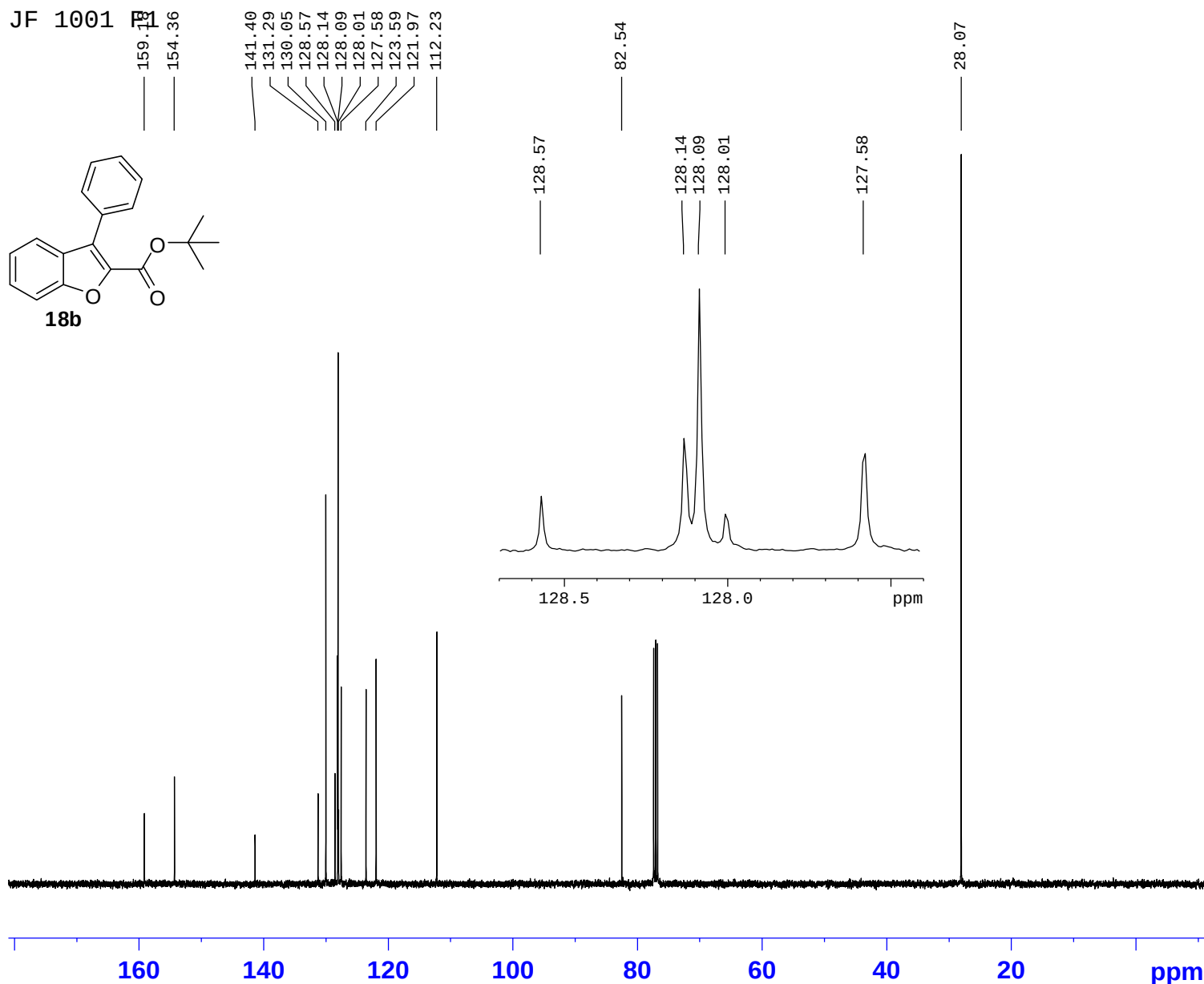
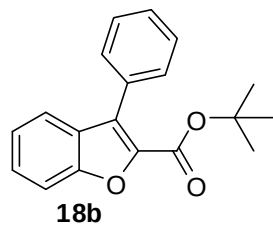
Current Data Parameters
NAME 20140210
EXPNO 230
PROCNO 1

F2 - Acquisition Parameters
Date_ 20140210
Time 12.42
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 80.6
DW 60.800 usec
DE 10.00 usec
TE 294.4 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300093 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00

JF 1001 F1



Current Data Parameters
 NAME 20140210
 EXPNO 620
 PROCNO 1

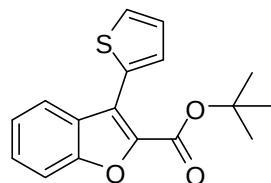
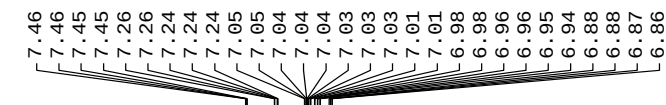
F2 - Acquisition Parameters
 Date_ 20140210
 Time 22.33
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 96
 DS 4
 SWH 26178.010 Hz
 FIDRES 0.399445 Hz
 AQ 1.2517875 sec
 RG 23170.5
 DW 19.100 usec
 DE 10.00 usec
 TE 300.0 K
 D1 2.00000000 sec
 d11 0.03000000 sec
 DELTA 1.89999998 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 13C
 P1 6.50 usec
 PL1 -4.00 dB
 SF01 100.6228292 MHz

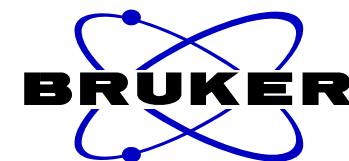
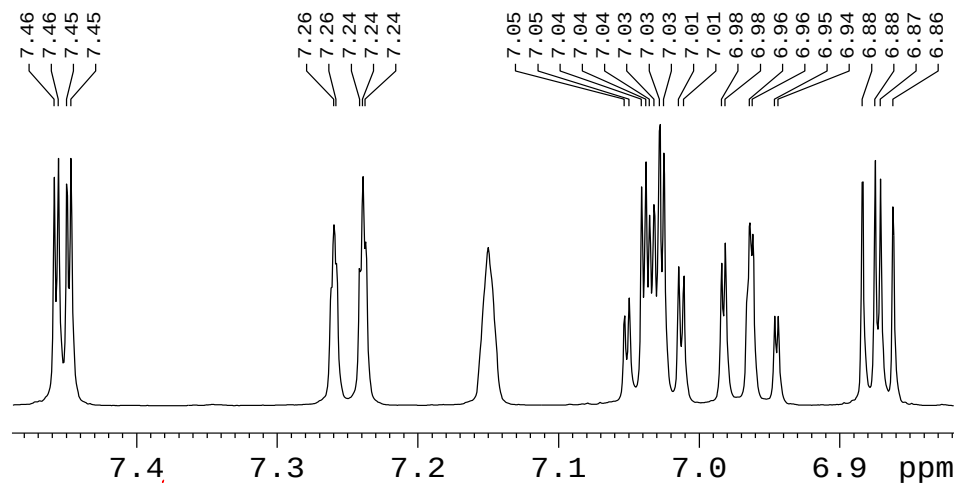
===== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PL2 -4.00 dB
 PL12 11.78 dB
 PL13 18.75 dB
 SF02 400.1316005 MHz

F2 - Processing parameters
 SI 32768
 SF 100.6127690 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

BA 1137



18c

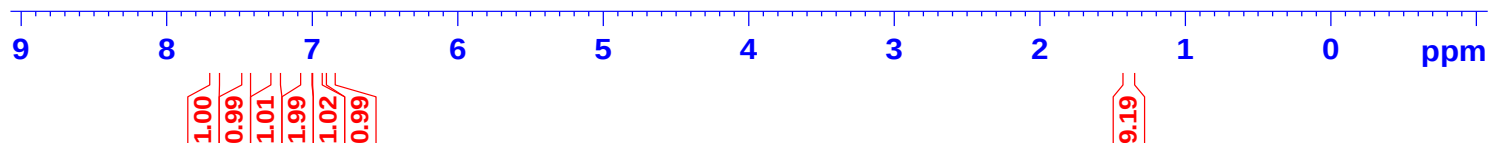


Current Data Parameters
NAME 20120403
EXPNO 530
PROCNO 1

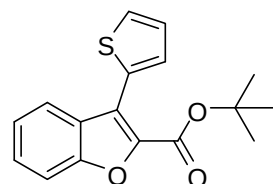
F2 - Acquisition Parameters
Date_ 20120403
Time 17.47
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT C6D6
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 64
DW 60.800 usec
DE 10.00 usec
TE 295.6 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

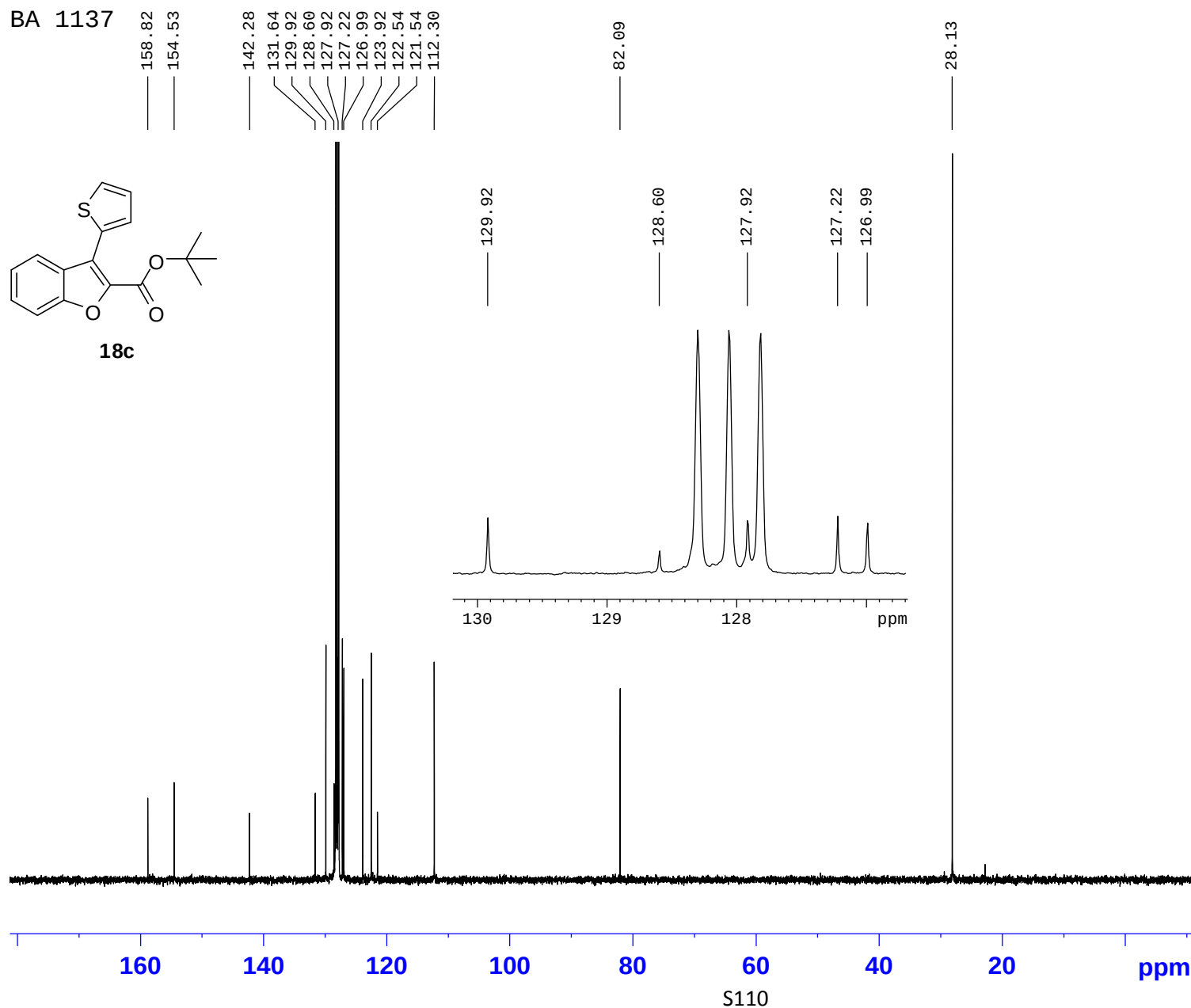
F2 - Processing parameters
SI 32768
SF 400.1300481 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00



BA 1137



18c



Current Data Parameters
 NAME 20120404
 EXPNO 240
 PROCNO 1

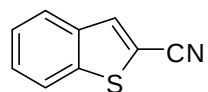
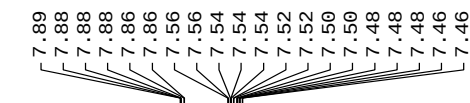
F2 - Acquisition Parameters
 Date_ 20120404
 Time 12.20
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT C6D6
 NS 64
 DS 4
 SWH 26178.010 Hz
 FIDRES 0.399445 Hz
 AQ 1.2517875 sec
 RG 18390.4
 DW 19.100 usec
 DE 10.00 usec
 TE 296.2 K
 D1 2.00000000 sec
 d11 0.03000000 sec
 DELTA 1.89999998 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 13C
 P1 6.50 usec
 PL1 -4.00 dB
 SF01 100.6228292 MHz

===== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PL2 -4.00 dB
 PL12 11.78 dB
 PL13 18.75 dB
 SF02 400.1316005 MHz

F2 - Processing parameters
 SI 32768
 SF 100.6127444 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

DGP BA 1169



21a

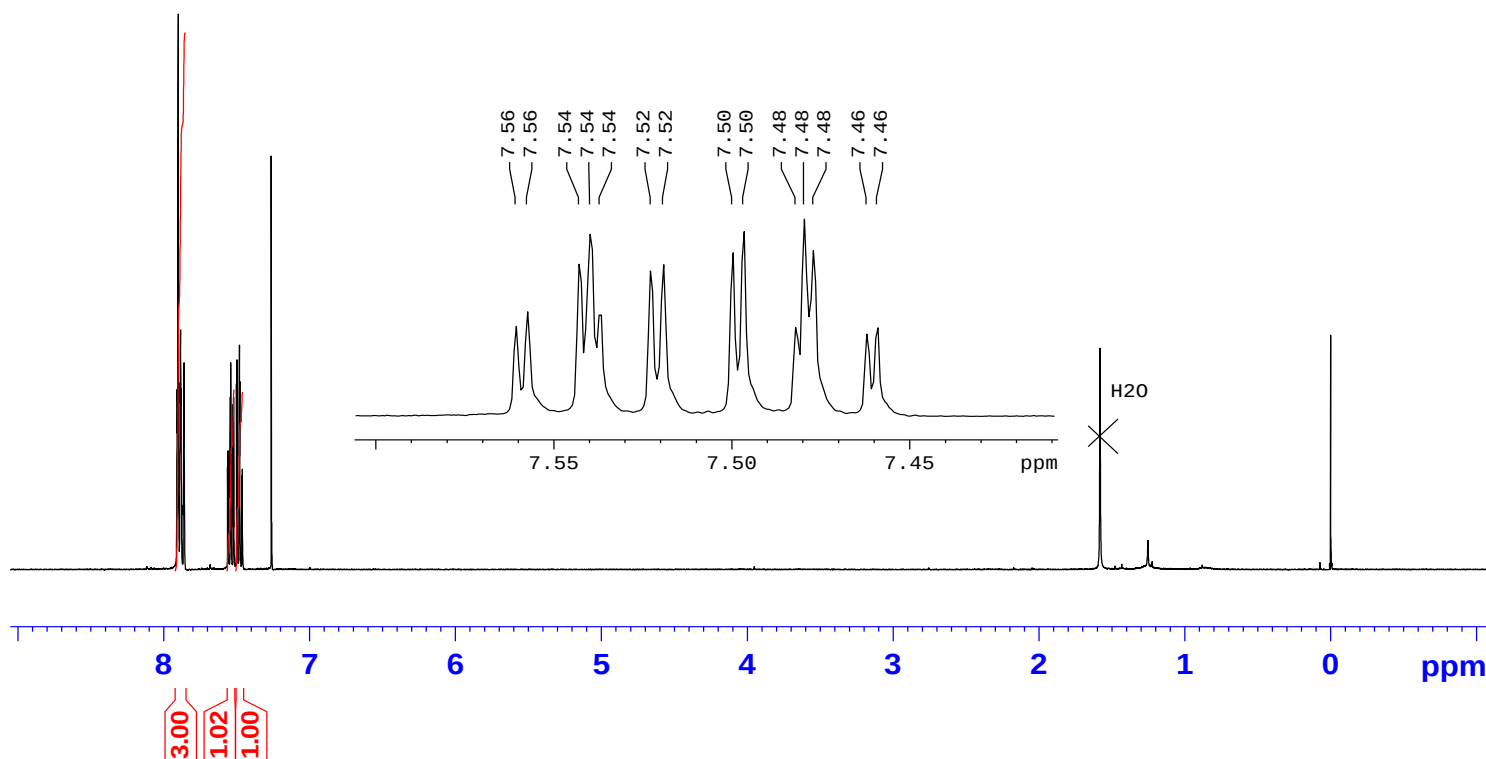


Current Data Parameters
NAME 20131112
EXPNO 70
PROCNO 1

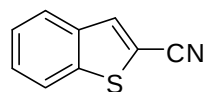
F2 - Acquisition Parameters
Date_ 20131112
Time 10.23
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 406.4
DW 60.800 usec
DE 10.00 usec
TE 294.5 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300091 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00

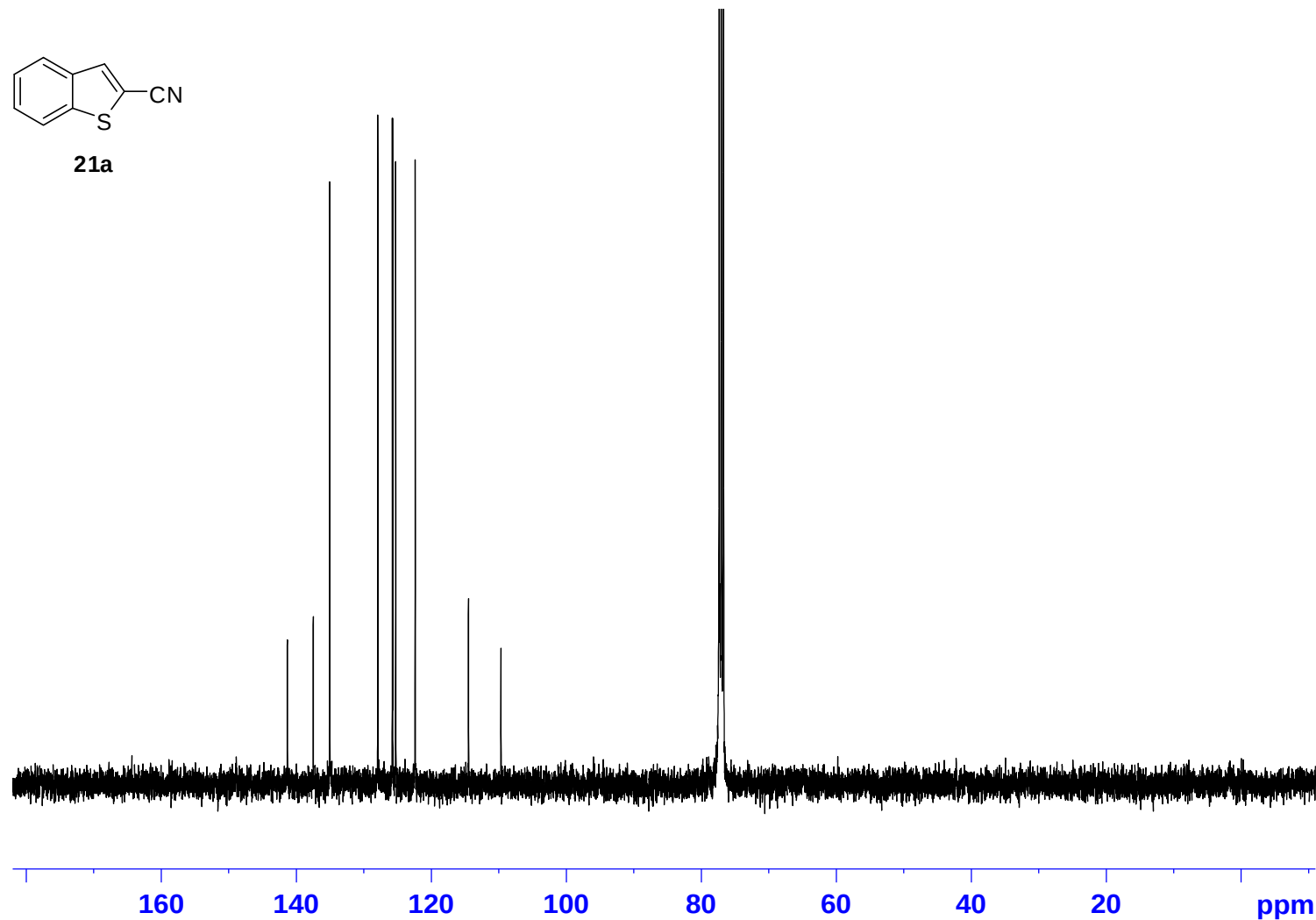


DGP BA 1169

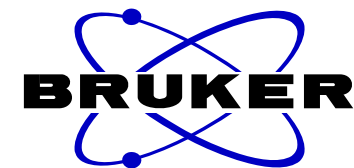


21a

141.32
137.47
135.03
127.91
125.76
125.32
122.42
114.52
109.71



S112



Current Data Parameters
NAME 20131115
EXPNO 470
PROCNO 1

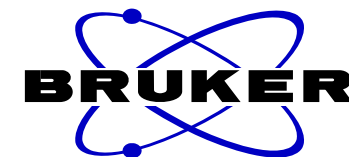
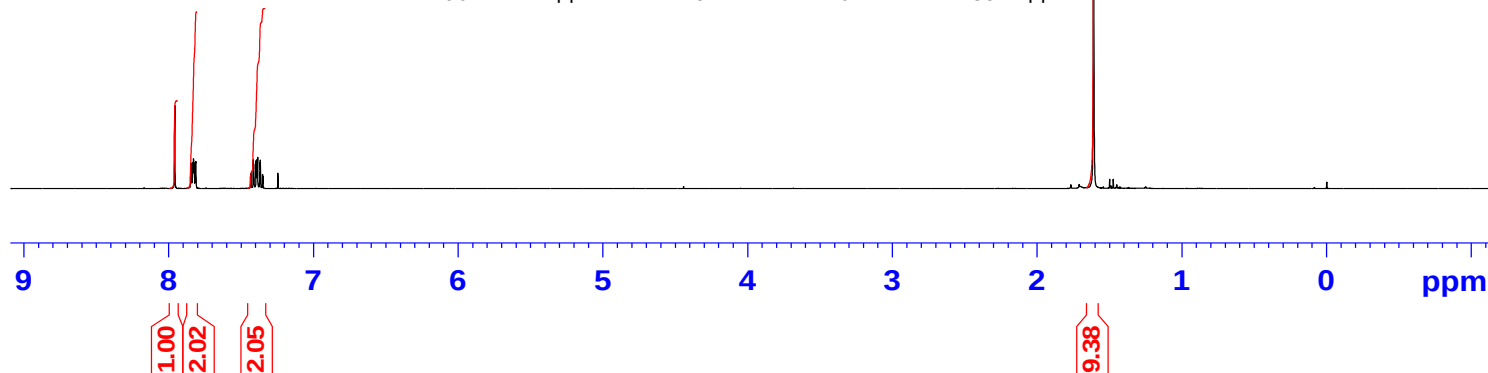
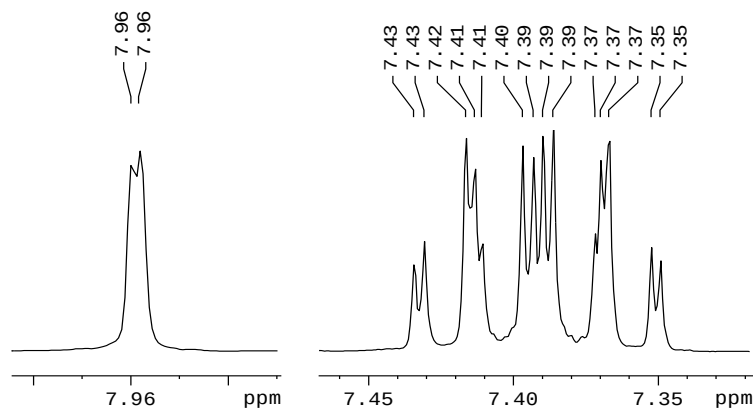
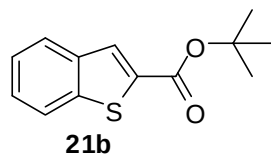
F2 - Acquisition Parameters
Date_ 20131115
Time 23.00
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1400
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 29193
DW 19.100 usec
DE 10.00 usec
TE 300.0 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

DGP BA 1170



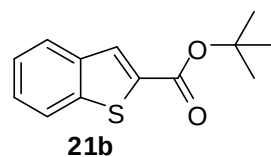
Current Data Parameters
NAME 20131112
EXPNO 50
PROCNO 1

F2 - Acquisition Parameters
Date_ 20131112
Time 10.07
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 80.6
DW 60.800 usec
DE 10.00 usec
TE 294.4 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300146 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00

DGP BA 1170



162.07

142.08

138.84

135.78

129.72

126.64

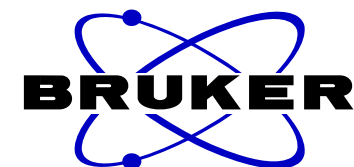
125.38

124.77

122.71

82.34

28.23



Current Data Parameters

NAME 20131112
EXPNO 550
PROCNO 1

F2 - Acquisition Parameters

Date_ 20131112
Time 20.55
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 96
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 26008
DW 19.100 usec
DE 10.00 usec
TE 295.3 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

===== CHANNEL f1 =====

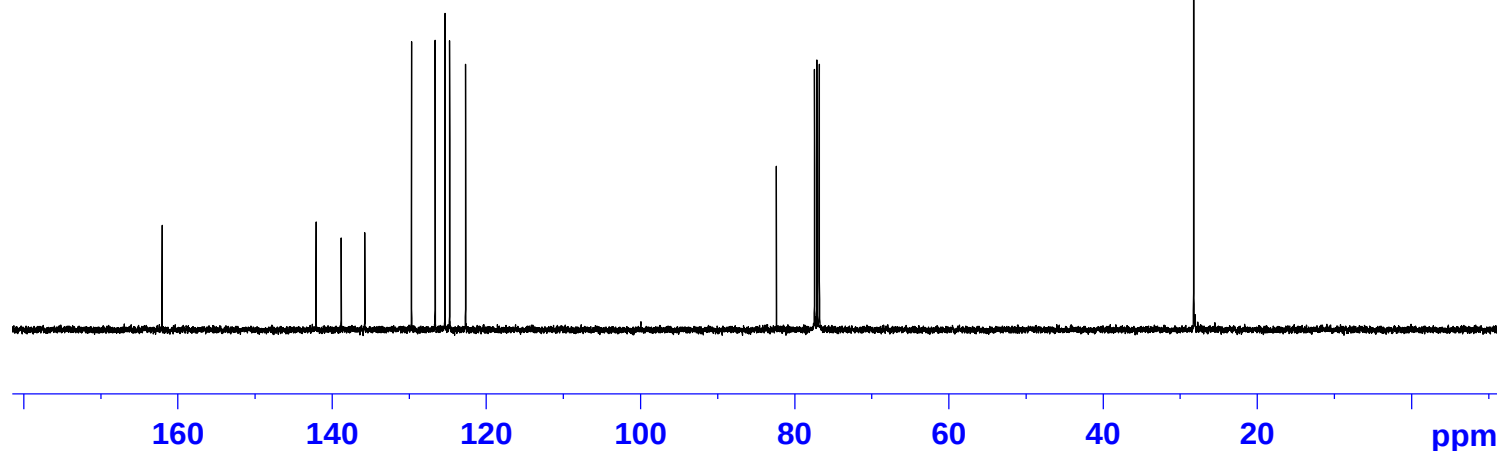
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====

CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters

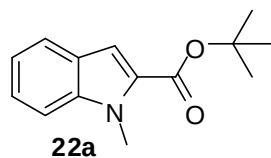
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



S114

DGP BA 1264

7.67
7.66
7.65
7.64
7.64
7.36
7.36
7.36
7.35
7.35
7.33
7.33
7.22
7.22
7.15
7.15
7.14
7.13
7.13
7.12
7.11

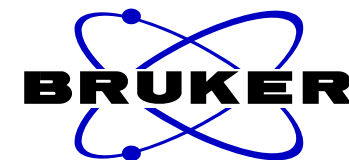
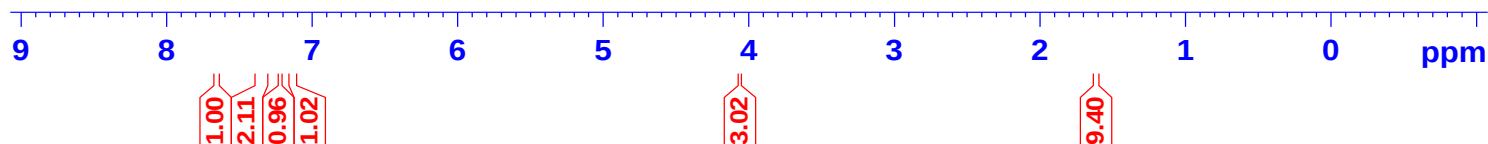
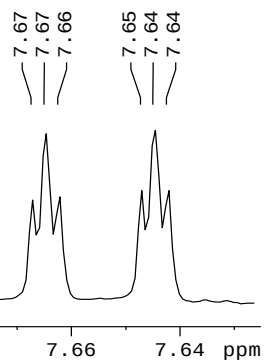
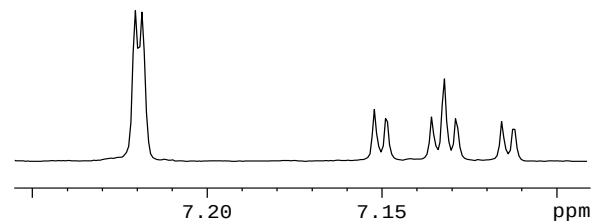


7.22
7.22

7.15
7.15
7.14
7.13
7.13
7.12
7.11

4.06

1.61



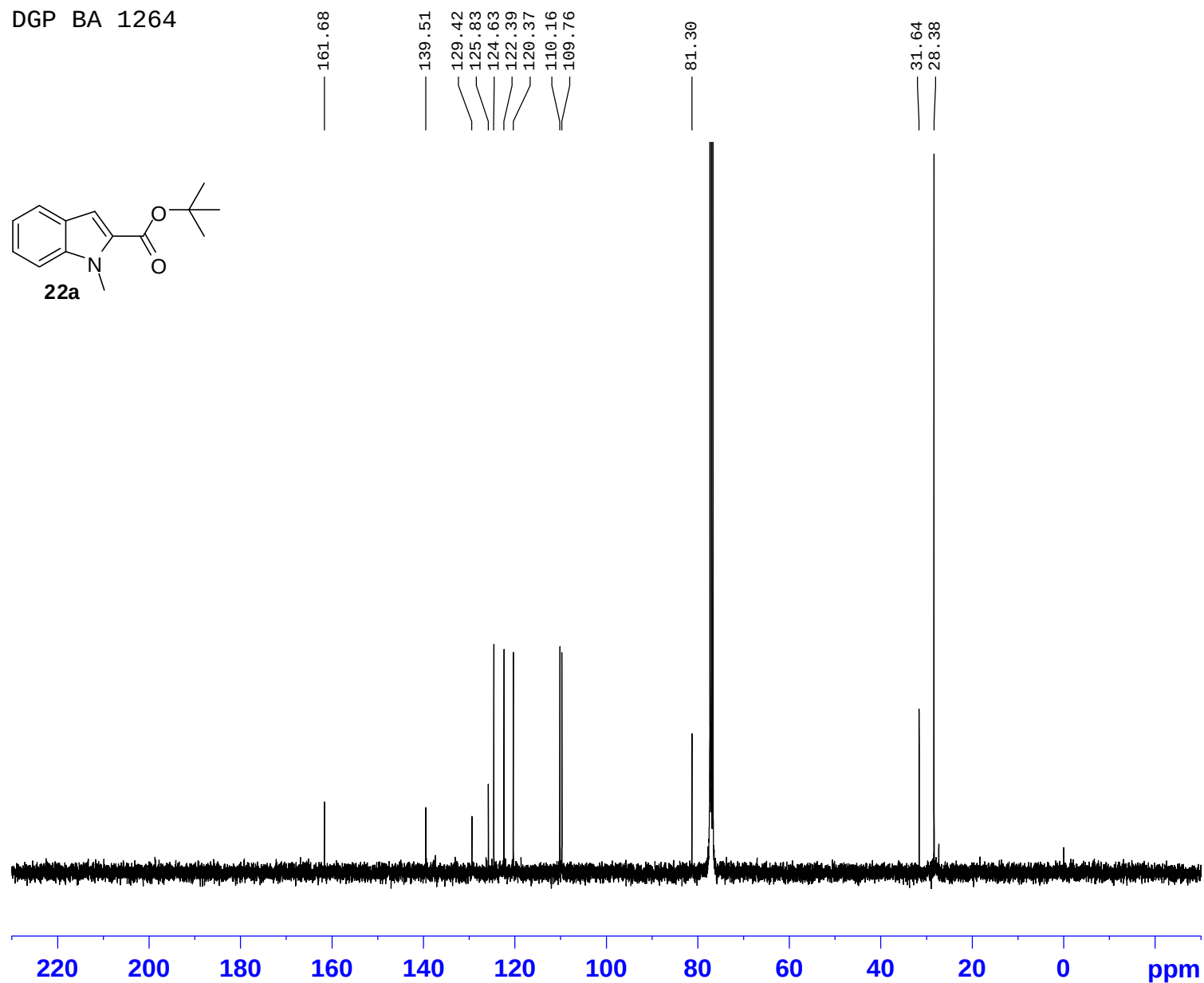
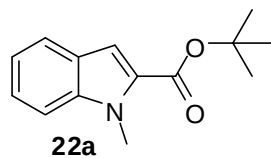
Current Data Parameters
NAME 20131108
EXPNO 380
PROCNO 1

F2 - Acquisition Parameters
Date_ 20131108
Time 16.59
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 322.5
DW 60.800 usec
DE 10.00 usec
TE 295.2 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300101 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00

DGP BA 1264



S116



Current Data Parameters
NAME 20131114
EXPNO 390
PROCNO 1

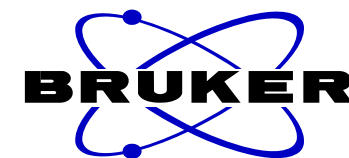
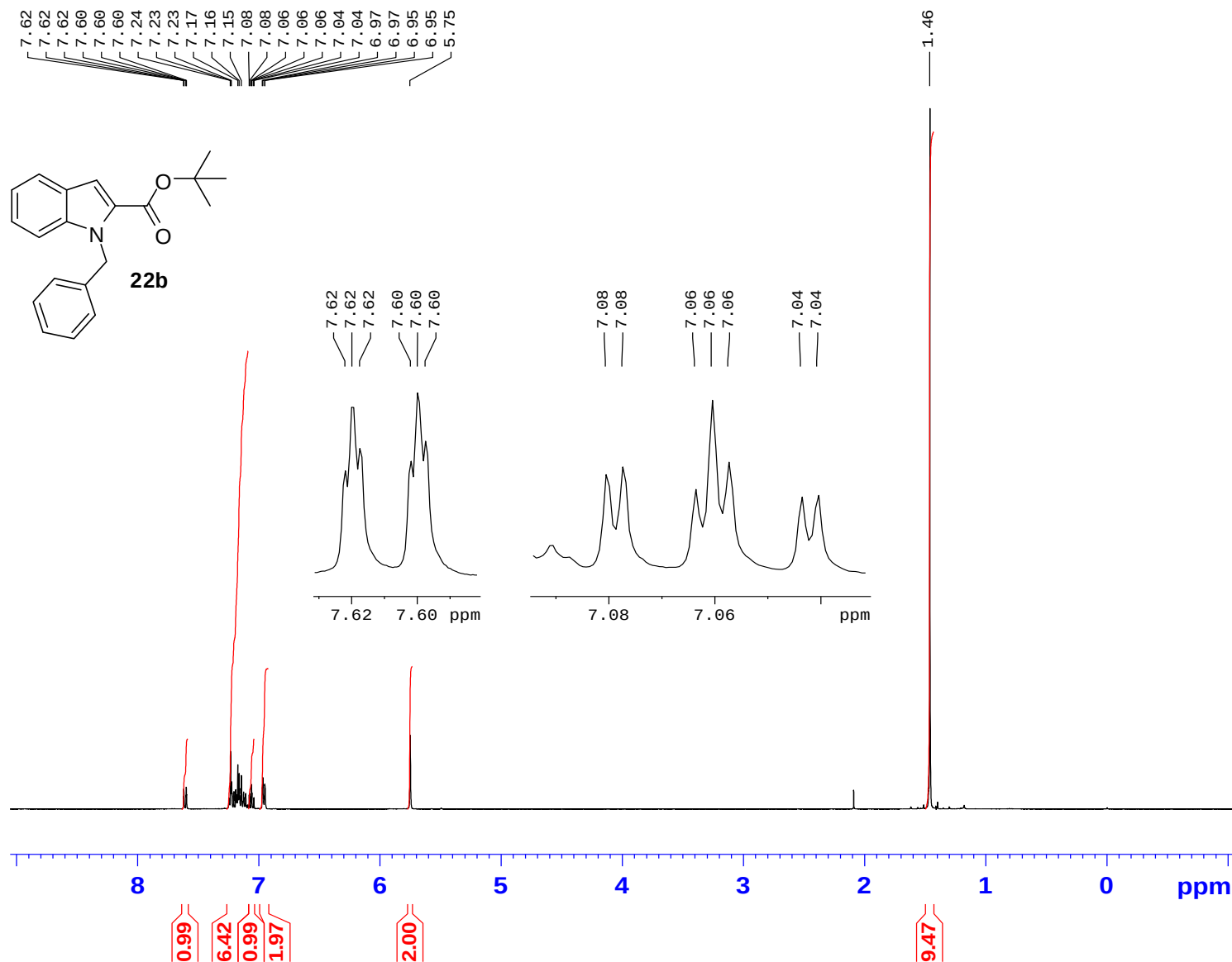
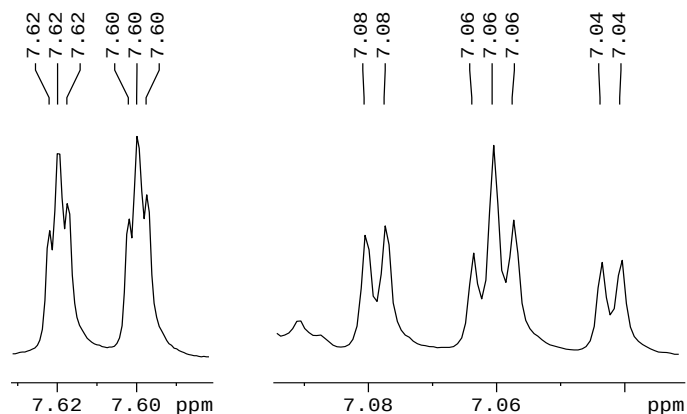
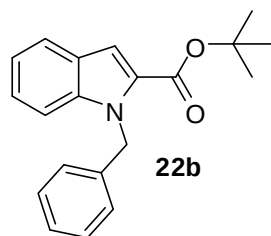
F2 - Acquisition Parameters
Date_ 20131114
Time 20.38
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1000
DS 4
SWH 26178.010 Hz
FIDRES 0.399445 Hz
AQ 1.2517875 sec
RG 26008
DW 19.100 usec
DE 10.00 usec
TE 300.0 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

===== CHANNEL f1 =====
NUC1 13C
P1 6.50 usec
PL1 -4.00 dB
SF01 100.6228292 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 11.78 dB
PL13 18.75 dB
SF02 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

JF-1009A



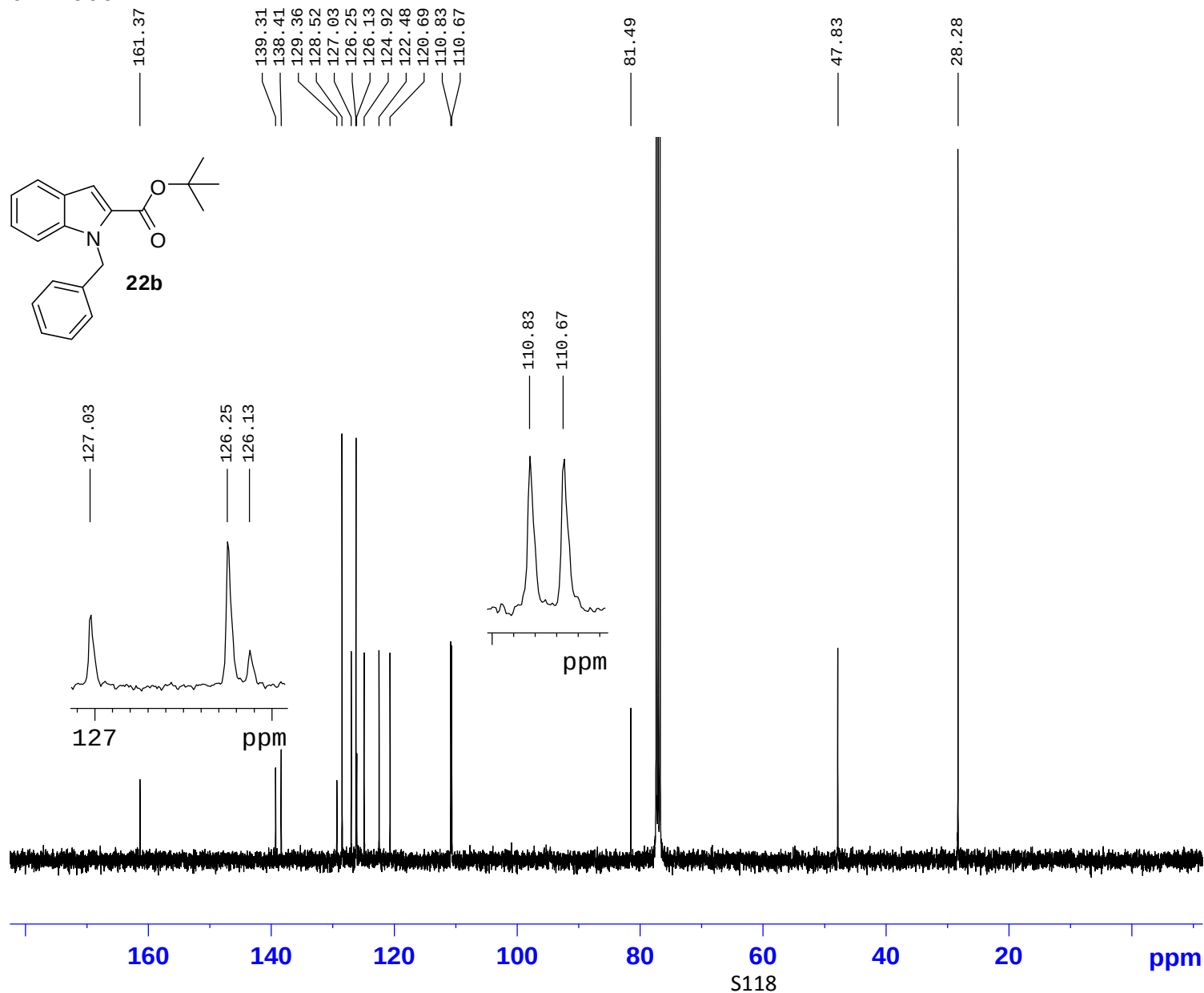
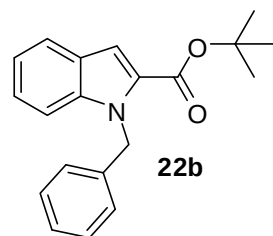
Current Data Parameters
NAME 20140213
EXPNO 80
PROCNO 1

F2 - Acquisition Parameters
Date_ 20140213
Time 10.16
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 181
DW 60.800 usec
DE 10.00 usec
TE 294.5 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300438 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00

JF 1009 F1



Current Data Parameters
 NAME 20140214
 EXPNO 570
 PROCNO 1

F2 - Acquisition Parameters

Date_ 20140215
 Time 19.58
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 512
 DS 4
 SWH 26178.010 Hz
 FIDRES 0.399445 Hz
 AQ 1.2517875 sec
 RG 23170.5
 DW 19.100 usec
 DE 10.00 usec
 TE 295.7 K
 D1 2.00000000 sec
 d11 0.03000000 sec
 DELTA 1.89999998 sec
 TD0 1

===== CHANNEL f1 =====

NUC1 13C
 P1 6.50 usec
 PL1 -4.00 dB
 SF01 100.6228292 MHz

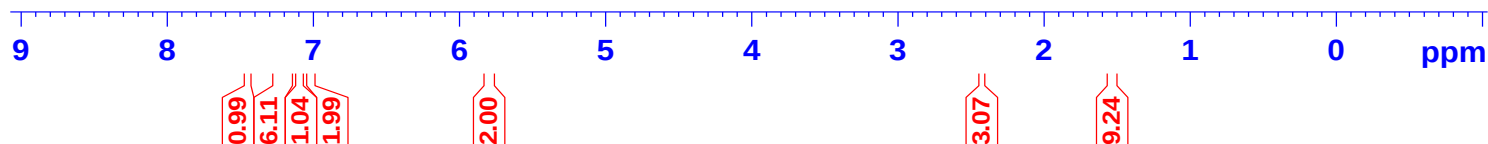
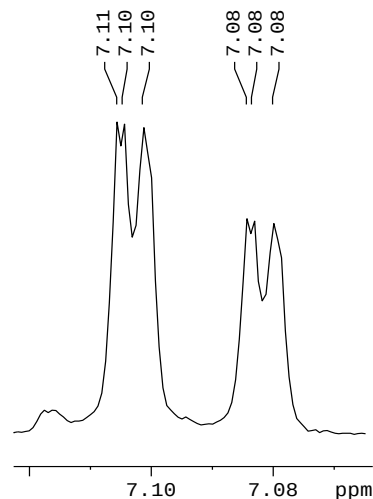
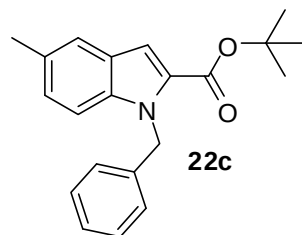
===== CHANNEL f2 =====

CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PL2 -4.00 dB
 PL12 11.78 dB
 PL13 18.75 dB
 SF02 400.1316005 MHz

F2 - Processing parameters

SI 32768
 SF 100.6127690 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

DGP BA 1299



Current Data Parameters
NAME 20130627
EXPNO 410
PROCNO 1

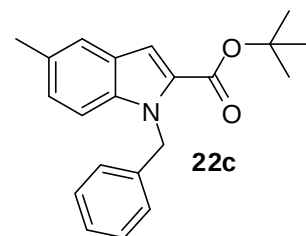
F2 - Acquisition Parameters
Date_ 20130627
Time 20.02
INSTRUM spect
PROBHD 5 mm DUL 13C-1
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8223.685 Hz
FIDRES 0.125483 Hz
AQ 3.9846387 sec
RG 322.5
DW 60.800 usec
DE 10.00 usec
TE 295.5 K
D1 1.00000000 sec
TD0 1

===== CHANNEL f1 =====
NUC1 1H
P1 10.50 usec
PL1 -6.00 dB
SF01 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300114 MHz
WDW EM
SSB 0
LB 0.00 Hz
GB 0
PC 1.00

S119

DGP BA 1299



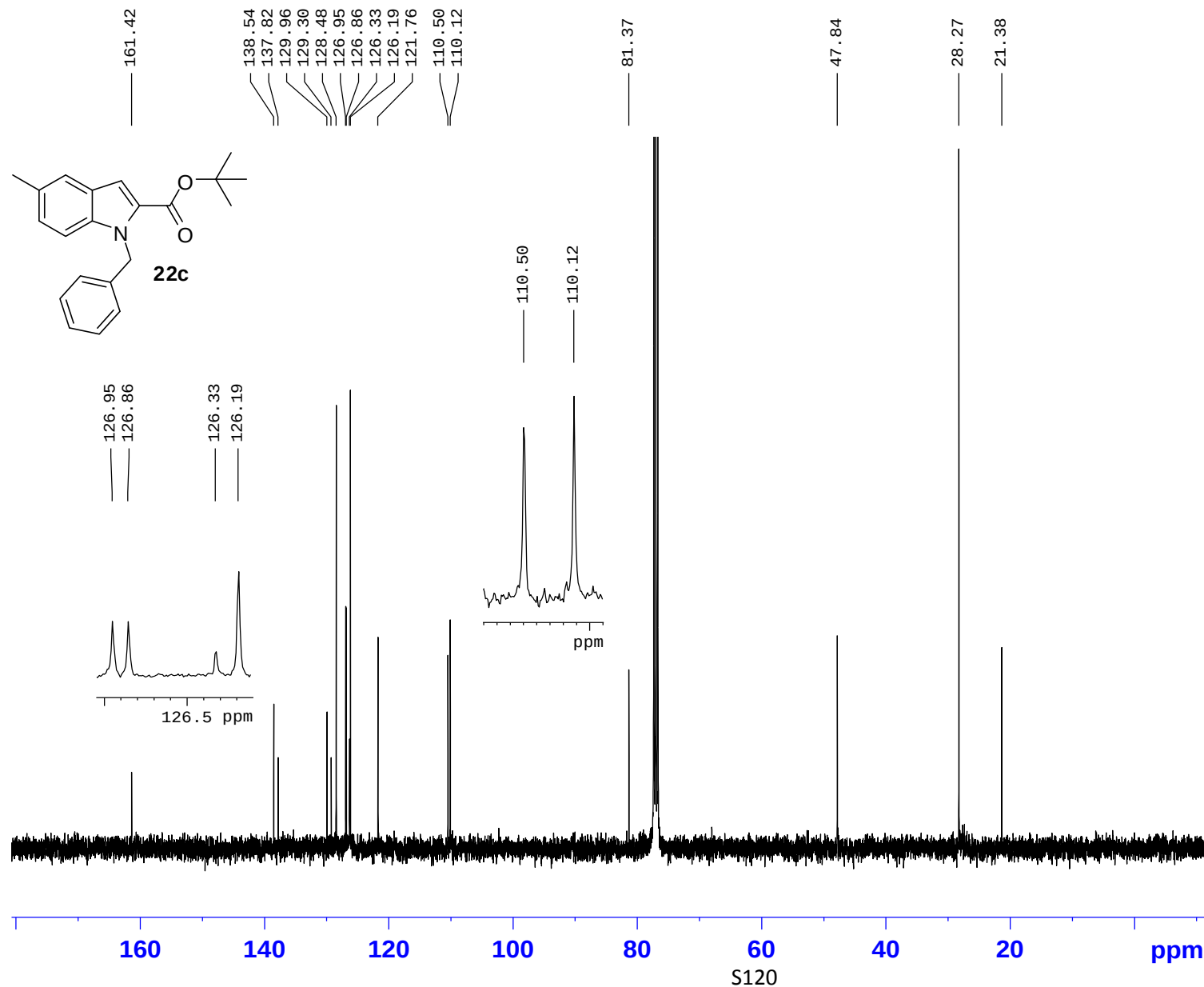
Current Data Parameters
 NAME 20131122
 EXPNO 770
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20131124
 Time 23.58
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT CDCl3
 NS 900
 DS 4
 SWH 26178.010 Hz
 FIDRES 0.399445 Hz
 AQ 1.2517875 sec
 RG 29193
 DW 19.100 usec
 DE 10.00 usec
 TE 295.4 K
 D1 2.00000000 sec
 d11 0.03000000 sec
 DELTA 1.89999998 sec
 TD0 1

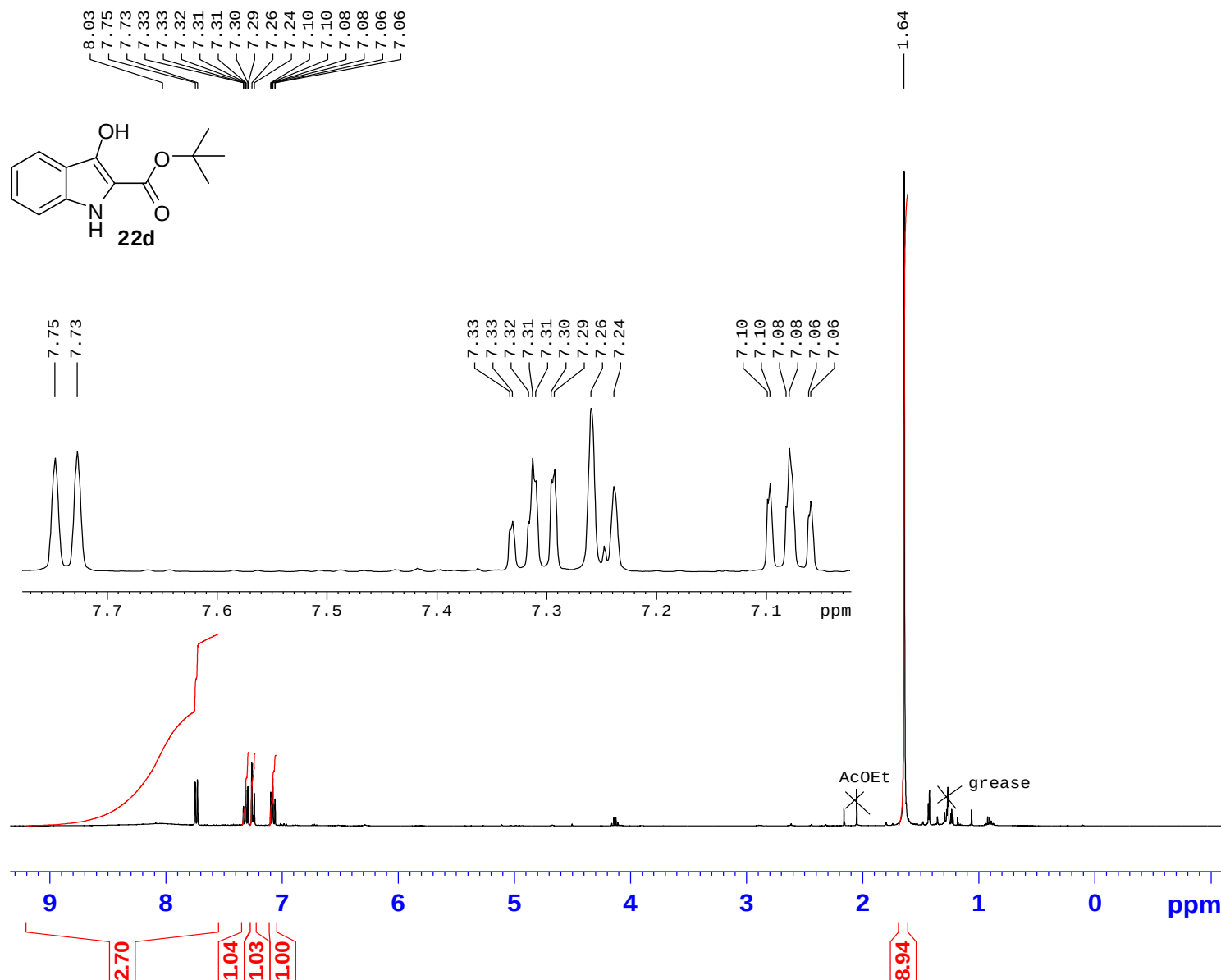
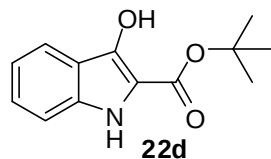
===== CHANNEL f1 =====
 NUC1 13C
 P1 6.50 usec
 PL1 -4.00 dB
 SF01 100.6228292 MHz

===== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PL2 -4.00 dB
 PL12 11.78 dB
 PL13 18.75 dB
 SF02 400.1316005 MHz

F2 - Processing parameters
 SI 32768
 SF 100.6127690 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



JF 1042 F1



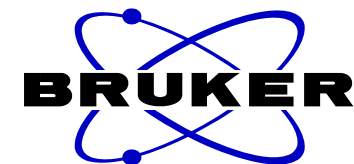
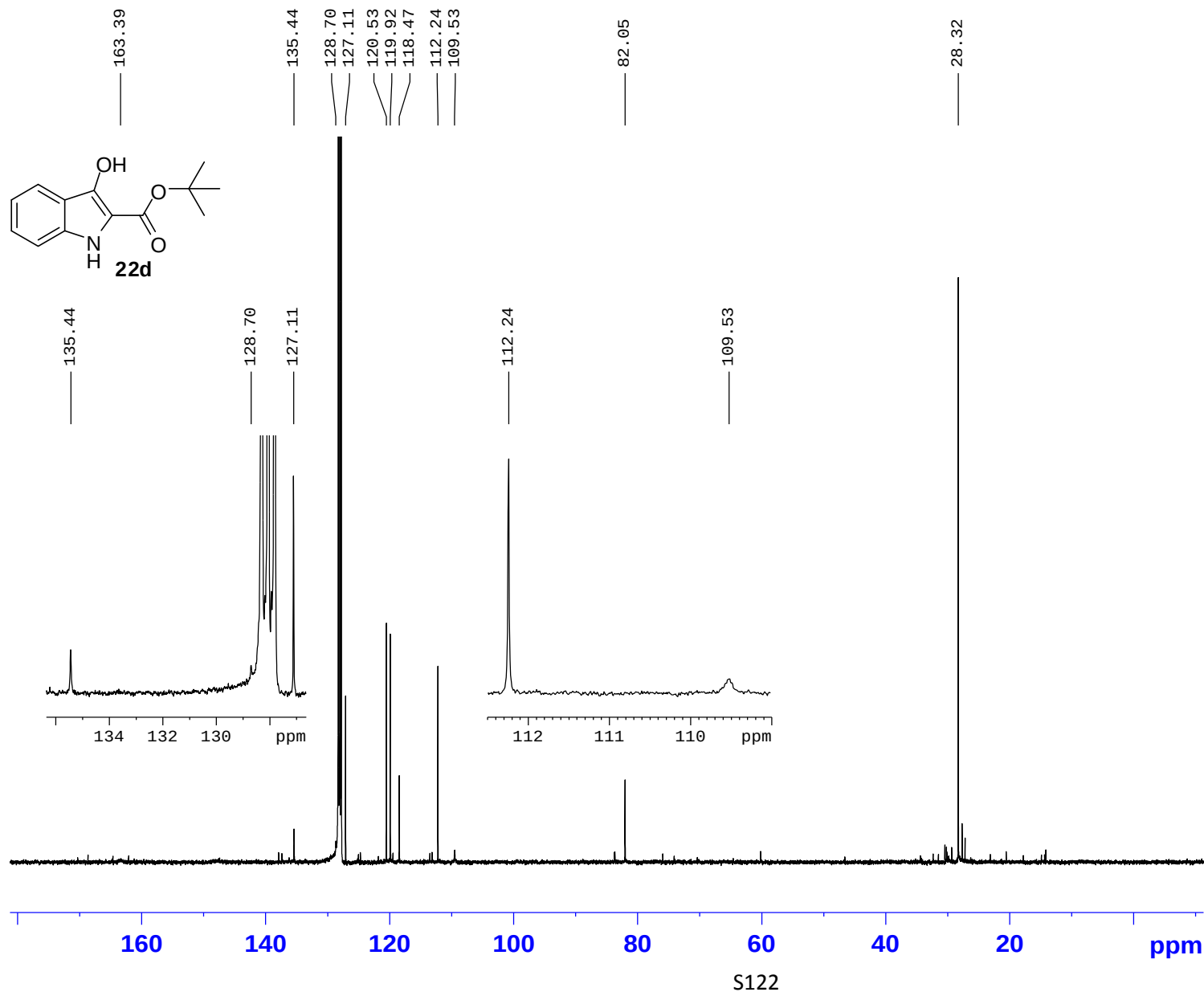
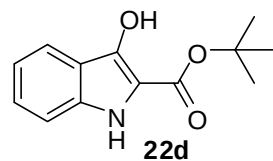
Current Data Parameters
 NAME 20140307
 EXPNO 420
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20140307
 Time 15.19
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zg30
 TD 65536
 SOLVENT CDCl3
 NS 16
 DS 2
 SWH 8223.685 Hz
 FIDRES 0.125483 Hz
 AQ 3.9846387 sec
 RG 57
 DW 60.800 usec
 DE 10.00 usec
 TE 295.0 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 10.50 usec
 PL1 -6.00 dB
 SF01 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300144 MHz
 WDW EM
 SSB 0
 LB 0.00 Hz
 GB 0
 PC 1.00

JF 1042A



Current Data Parameters
 NAME 20140311
 EXPNO 730
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20140312
 Time 2.18
 INSTRUM spect
 PROBHD 5 mm DUL 13C-1
 PULPROG zgpg30
 TD 65536
 SOLVENT C6D6
 NS 512
 DS 4
 SWH 26178.010 Hz
 FIDRES 0.399445 Hz
 AQ 1.2517875 sec
 RG 13004
 DW 19.100 usec
 DE 10.00 usec
 TE 295.6 K
 D1 4.00000000 sec
 d11 0.03000000 sec
 DELTA 3.90000010 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 13C
 P1 6.50 usec
 PL1 -4.00 dB
 SF01 100.6228292 MHz

===== CHANNEL f2 =====
 CPDPRG2 waltz16
 NUC2 1H
 PCPD2 80.00 usec
 PL2 -4.00 dB
 PL12 11.78 dB
 PL13 18.75 dB
 SF02 400.1316005 MHz

F2 - Processing parameters
 SI 32768
 SF 100.6127440 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40