Pd(II)-catalyzed *o*-aroylation of directing arenes using terminal aryl alkenes and alkynes

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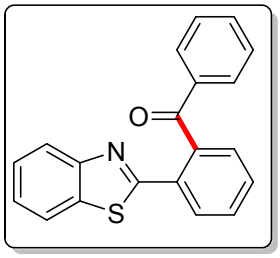
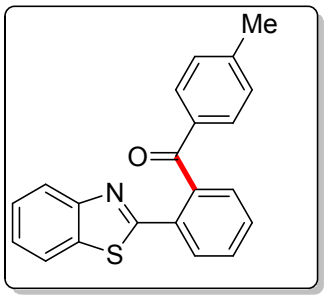
Experimental:

General information:

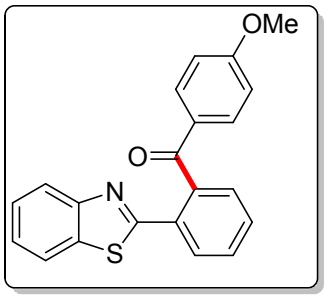
All the reagents were commercial grade and purified according to the established procedures. Organic extracts were dried over anhydrous sodium sulphate. Solvents were removed in a rotary evaporator under reduced pressure. Silica gel (60–120 mesh size) was used for the column chromatography. Reactions were monitored by TLC on silica gel 60 F254 (0.25 mm). NMR spectra were recorded in $CDCl_3$ with tetramethylsilane as the internal standard for ^{1}H NMR (400 MHz and 600 MHz) and $CDCl_3$ solvent as the internal standard for ^{13}C NMR (100 MHz and 150 MHz). Mass spectra were recorded using WATERS MS system, Q-tof premier and data analyzed using Mass Lynx 4.1.Elemental analysis was performed with a Perkin Elmer 2400 elemental analyzer. IR spectra were recorded in KBr or neat on a Nicolet Impact 410 spectrophotometer.



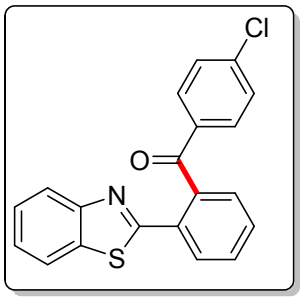
(2-(Benzo[*d*]thiazol-2-yl)phenyl)(phenyl)methanone (1a): Gummy; ^{1}H NMR ($CDCl_3$, 400 MHz): δ (ppm) 7.25-7.31 (m, 2H), 7.32-7.39 (m, 2H), 7.47 (t, 2H, *J* = 7.6 Hz), 7.54 (d, 1H, *J* = 6.8 Hz), 7.57-7.64 (m, 2H), 7.76 (d, 1H, *J* = 7.6 Hz), 7.79 (d, 1H, *J* = 8.4 Hz), 7.92 (d, 1H, *J* = 7.2 Hz), 8.12 (d, 1H, *J* = 7.6 Hz); ^{13}C NMR ($CDCl_3$, 100 MHz): δ (ppm) 121.5, 123.4, 125.4, 126.3, 128.3, 128.5, 129.4, 130.3, 130.4, 132.1, 132.8, 133.8, 135.3, 137.8, 139.7, 153.4, 165.6, 197.7; IR (KBr): 3060, 2922, 2848, 2554, 1686, 1668, 1596, 1581, 1451, 1426, 1315, 1283, 1258, 1176, 1054, 1026, 969, 923, 761 cm^{-1}; HRMS (ESI): calcd. for $C_{20}H_{13}NOS(MH^+)$ 316.0791; found 316.0793.



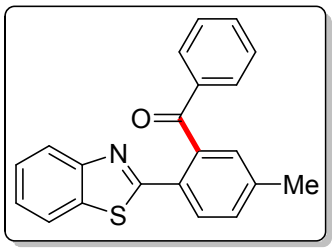
(2-(Benzo[*d*]thiazol-2-yl)phenyl)(p-tolyl)methanone (1b): Gummy; ^{1}H NMR ($CDCl_3$, 400 MHz): δ (ppm) 2.29 (s, 3H), 7.10 (d, 2H, *J* = 8.0 Hz), 7.29 (t, 1H, *J* = 7.5 Hz), 7.36 (t, 1H, *J* = 7.6 Hz), 7.49 (d, 1H, *J* = 7.6 Hz), 7.56–7.63 (m, 2H), 7.67 (d, 2H, *J* = 8.0 Hz), 7.78 (d, 1H, *J* = 8.4 Hz), 7.81 (d, 1H, *J* = 8.2 Hz), 7.94 (d, 1H, *J* = 7.4 Hz); ^{13}C NMR ($CDCl_3$, 100 MHz): δ (ppm) 21.8, 121.6, 123.7, 125.4, 126.3, 128.9, 129.2, 129.7, 129.9, 130.2, 130.4, 132.2, 135.4, 135.6, 140.2, 143.8, 153.7, 165.6, 197.5; IR (KBr): 2967, 2850, 2772, 1638, 1510, 1479, 1458, 1432, 1313, 1224, 1071, 964, 766 cm^{-1}; HRMS (ESI) calcd for $C_{21}H_{15}NOS$ (MH^+) 330.0947, found 330.0943.



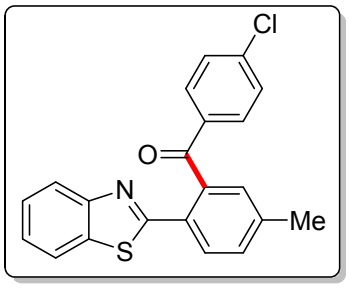
(2-(Benzo[*d*]thiazol-2-yl)phenyl)(4-methoxyphenyl)methanone (1c): Gummy; ^{1}H NMR ($CDCl_3$, 400 MHz): δ (ppm) 3.76 (s, 3H), 6.78 (d, 2H, *J* = 8.0 Hz), 7.26-7.31 (m, 1H), 7.36 (t, 1H, *J* = 7.6 Hz), 7.48 (d, 1H, *J* = 7.6 Hz), 7.55-7.62 (m, 2H), 7.76 (t, 3H, *J* = 8.4 Hz), 7.83 (d, 1H, *J* = 8.0 Hz), 7. 95 (d, 1H, *J* = 7.2 Hz); ^{13}C NMR ($CDCl_3$, 150 MHz): δ (ppm) 55.5, 113.8, 121.6, 123.7, 125.4, 126.3, 128.7, 129.9, 130.1, 130.3, 130.9, 131.9, 132.1, 135.7, 140.2, 153.7, 163.5, 165.6, 196.4; IR (KBr): 3063, 2931, 2838, 1660, 1600, 1510, 1456, 1433, 1314, 1256, 1175, 1150, 1029, 966, 929, 843, 762, 729 cm^{-1}; HRMS (ESI): calcd. for $C_{21}H_{15}NO_2S(MH^+)$ 346.0896; found 346.0900.



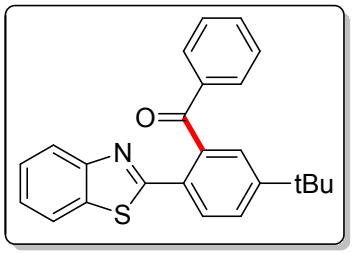
(2-(Benzo[*d*]thiazol-2-yl)phenyl)(4-chlorophenyl)methanone (1d): White solid; M.p. 134-136 ^{o}C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ (ppm) 7.24-7.27 (m, 2H), 7.29-7.34 (m, 1H), 7.35-7.39 (m, 1H), 7.51 (d, 1H, *J* = 6.8 Hz), 7.59-7.64 (m, 2H), 7.66-7.70 (m, 2H), 7.75-7.77 (m, 1H), 7.79-7.82 (m, 1H), 7.93 (d, 1H, *J* = 6.8 Hz); ^{13}C NMR ($CDCl_3$, 100 MHz): δ (ppm) 121.6, 123.6, 125.7, 126.5, 128.8, 128.9, 129.8, 130.5, 130.7, 132.1, 135.4, 136.5, 139.1, 139.4, 153.6, 165.2, 196.5; IR (KBr): 3055, 2957, 2923, 2845, 1670, 1585, 1571, 1482, 1427, 1400, 1305, 1289, 1263, 1241, 1185, 1150, 1090, 969, 936, 924, 845, 753 cm^{-1}; HRMS (ESI): calcd. for $C_{20}H_{12}ClNOS(MH^+)$ 350.0401; found 350.0410.



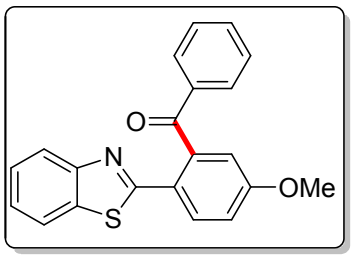
(2-(Benzo[*d*]thiazol-2-yl)-5-methylphenyl)(phenyl)methanone (2a): Gummy; ^{1}H NMR ($CDCl_3$, 400 MHz): δ (ppm) 2.46 (s, 3H), 7.24–7.30 (m, 3H), 7.33–7.38 (m, 3H), 7.41 (d, 1H, *J* = 8.0 Hz), 7.76–7.71 (m, 4H), 7.82 (d, 1H, *J* = 8.0 Hz); ^{13}C NMR ($CDCl_3$, 100 MHz): δ (ppm) 21.5, 121.4, 123.3, 125.2, 126.2, 128.3, 129.3, 129.4, 129.7, 130.9, 132.7, 133.7, 135.2, 137.9, 139.7, 141.0, 153.5, 165.6, 197.9; IR (KBr): 3052, 3022, 2928, 2855, 1668, 1597, 1563, 1511, 1479, 1452, 1432, 1401, 1315, 1289, 1258, 1208, 1179, 1116, 1075, 975, 854, 826, 789, 757 cm^{-1}; Anal. calcd for $C_{21}H_{15}NOS$: C 76.57, H 4.59, N 4.25; found: C 76.65, H 4.65, N 4.20.



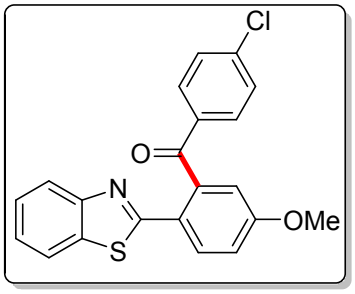
(2-(Benzo[*d*]thiazol-2-yl)-5-methylphenyl)(4-chlorophenyl)methanone (2d): Yellow solid; M.p. 162-164 ^{o}C; ^{1}H NMR ($CDCl_3$, 600 MHz): δ (ppm) 2.46 (s, 3H), 7.27 (d, 2H, *J* = 7.8 Hz), 7.30-7.35 (m, 2H), 7.37 (t, 1H, *J* = 3.6 Hz), 7.41 (d, 1H, *J* = 7.8 Hz), 7.69 (d, 2H, *J* = 9.6 Hz), 7.73 (d, 1H, *J* = 7.8 Hz), 7.77 (d, 1H, *J* = 7.8 Hz), 7.81 (d, 1H, *J* = 7.8 Hz); ^{13}C NMR ($CDCl_3$, 150 MHz): δ (ppm) 21.6, 121.6, 123.4, 125.5, 126.3, 128.7, 129.1, 129.4, 129.7, 130.6, 131.2, 135.2, 136.6, 139.0, 139.3, 141.3, 153.6, 165.3, 196.7; IR (KBr): 3056, 2958, 2924, 1661, 1637, 1606, 1585, 1572, 1482, 1426, 1398, 1311, 1287, 1259, 1182, 1151, 1091, 1010, 924, 826, 758 cm^{-1}; HRMS (ESI): calcd. for $C_{21}H_{14}ClNOS(MH^{+})$ 364.0557; found 364.0561.



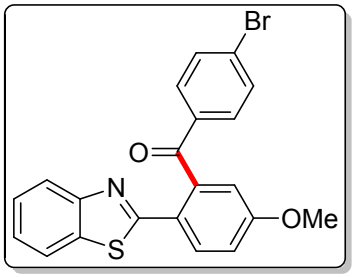
(2-(Benzo[*d*]thiazol-2-yl)-5-(*tert*-butyl)phenyl)(phenyl)methanone (3a): Gummy; ^{1}H NMR ($CDCl_3$, 400 MHz): δ (ppm) 1.38 (s, 9H), 7.24–7.31 (m, 4H), 7.33–7.38 (m, 2H), 7.53 (s, 1H), 7.63 (d, 1H, *J* = 8.4 Hz), 7.74–7.78 (m, 3H), 7.86 (d, 1H, *J* = 12.0 Hz); ^{13}C NMR ($CDCl_3$, 100 MHz): δ (ppm) 31.3, 35.3, 121.5, 123.4, 125.3, 125.9, 126.2, 127.4, 128.3, 129.4, 129.6, 132.7, 135.3, 138.1, 139.5, 153.7, 154.2, 165.5, 198.3; IR (KBr): 3068, 3028, 2967, 1670, 1596, 1560, 1515, 1485, 1449, 1431, 1395, 1368, 1314, 1255, 1162, 1105, 1023, 972, 902, 857, 805, 759 cm^{-1}; Anal. calcd for $C_{24}H_{21}NOS$: C 77.59, H 5.70, N 3.77; found: C 77.67, H 5.76, N 3.71.



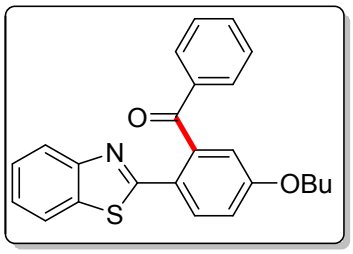
(2-(Benzo[*d*]thiazol-2-yl)-5-methoxyphenyl)(phenyl)methanone (4a): Brown solid; M.p. 147-149 ^{o}C; ^{1}H NMR ($CDCl_3$, 600 MHz): δ (ppm) 3.89 (s, 3H), 7.02 (d, 1H, *J* = 2.4 Hz), 7.12 (dd, 1H, J_1 = 2.4 Hz, J_2 = 9.0 Hz), 7.23-7.26 (m, 1H), 7.27-7.33 (m, 3H), 7.36-7.38 (m, 1H), 7.73 (t, 2H, *J* = 9.0 Hz), 7.77 (d, 2H, *J* = 6.6 Hz), 7.86 (d, 1H, *J* = 9. 0 Hz); ^{13}C NMR ($CDCl_3$, 150 MHz): δ (ppm) 55.9, 114.1, 116.1, 121.4, 123.3, 124.7, 125.1, 126.2, 128.4, 129.4, 131.3, 132.9, 135.2, 137.8, 141.5, 153.7, 161.3, 165.2, 197.4; IR (KBr): 3052, 2926, 2848, 1668, 1599, 1485, 1465, 1448, 1437, 1399, 1331, 1247, 1221, 1178, 1105, 1029, 965, 839, 762, 729, 709 cm^{-1}; HRMS (ESI): calcd. for $C_{21}H_{15}NO_2S(MH^+)$ 346.0896; found 346.0901.



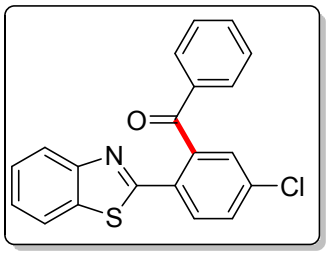
(2-(Benzo[*d*]thiazol-2-yl)-5-methoxyphenyl)(4-chlorophenyl)methanone (4d): Yellow solid; M.p. 128-130 ^{o}C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ (ppm) 3.89 (s, 3H), 6.97 (d, 1H, J = 2.8 Hz), 7.12 (dd, 1H, J_1 = 2.8 Hz, J_2 = 8.4 Hz), 7.25-7.29 (m, 3H), 7.34 (t, 1H, J = 7.4 Hz), 7.71 (d, 3H, J = 8.4 Hz), 7.76 (d, 1H, J = 8.0 Hz), 7.86 (d, 1H, J = 8.8 Hz); ^{13}C NMR ($CDCl_3$, 100 MHz): δ (ppm) 55.9, 114.1, 116.2, 121.5, 123.2, 124.6, 125.3, 126.3, 128.8, 130.6, 131.4, 135.1, 136.4, 139.2, 140.9, 153.7, 161.5, 165.0, 196.2; IR (KBr): 3094, 2926, 2852, 1672, 1603, 1585, 1568, 1482, 1436, 1408, 1294, 1266, 1176, 1089, 1038, 970, 950, 828, 816, 754 cm^{-1}; HRMS (ESI): calcd. for $C_{21}H_{14}ClNO_2S(MH^+)$ 380.0507; found 380.0512.



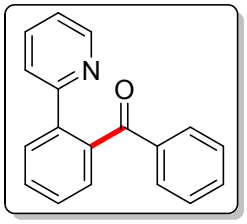
(2-(Benzo[*d*]thiazol-2-yl)-5-methoxyphenyl)(4-bromophenyl)methanone (4e): Yellow solid; M.p. 132-134 ^{o}C; ^{1}H NMR ($CDCl_3$, 600 MHz): δ (ppm) 3.89 (s, 3H), 6.99 (d, 1H, J = 2.4 Hz), 7.11 (dd, 1H, J_1 = 2.4 Hz, J_2 = 8.4 Hz), 7.27 (t, 1H, J = 7.2 Hz), 7.33 (t, 1H, J = 8.4 Hz), 7.42 (d, 2H, J = 8.4 Hz), 7.63 (d, 2H, J = 8.4 Hz), 7.69 (d, 1H, J = 7.8 Hz), 7.76 (d, 1H, J = 8.4 Hz), 7.85 (d, 1H, J = 9.0 Hz); ^{13}C NMR ($CDCl_3$, 150 MHz): δ (ppm) 55.9, 114.0, 116.2, 121.5, 123.2, 124.5, 125.3, 126.3, 127.9, 130.7, 131.3, 131.7, 135.1, 136.8, 140.9, 153.6, 161.4, 164.9, 196.3; IR (KBr): 3082, 2925, 2852, 1671, 1602, 1585, 1567, 1483, 1435, 1402, 1290, 1228, 1106, 1068, 969, 830, 758 cm^{-1}; HRMS (ESI): calcd. for $C_{21}H_{14}BrNO_2S(MH^+)$ 425.9982; found 425.9985



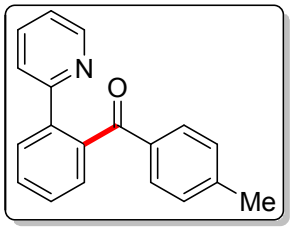
(2-(Benzo[*d*]thiazol-2-yl)-5-butoxyphenyl)(phenyl)methanone (5a): White solid; M.p. 131-133 ^{o}C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ (ppm) 0.98 (t, 3H, *J* = 7.6 Hz), 1.48–1.53 (m, 2H), 1.77–1.82 (m, 2H), 4.05 (t, 2H, *J* = 6.4 Hz), 7.01 (s, 1H), 7.11 (d, 1H, *J* = 8.6 Hz), 7.23–7.34 (m, 4H), 7.38 (t, 1H, *J* = 7.2 Hz), 7.73 (t, 2H, *J* = 7.2 Hz), 7.78 (d, 2H, *J* = 7.6 Hz), 7.85 (d, 1H, *J* = 8.8 Hz); ^{13}C NMR ($CDCl_3$, 100 MHz): δ (ppm) 13.9, 19.3, 31.3, 68.4, 114.6, 116.4, 121.4, 123.2, 124.4, 125.0, 126.1, 128.4, 129.4, 131.3, 132.8, 135.2, 137.8, 141.4, 153.7, 160.9, 165.3, 197.5; IR (KBr): 3058, 2961, 2928, 2870, 1674, 1607, 1568, 1511, 1485, 1437, 1410, 1294, 1227, 1111, 1076, 1043, 972, 953, 856, 823, 810, 762 cm^{-1}; Anal. calcd for $C_{24}H_{21}NO_2S$: C 74.39, H 5.46, N 3.61; found: C 74.48, H 5.51, N 3.52.



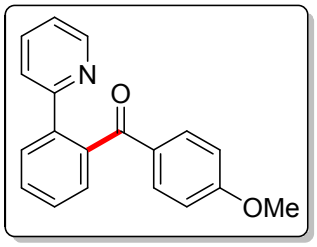
(2-(Benzo[*d*]thiazol-2-yl)-5-chlorophenyl)(phenyl)methanone (6a): White solid; M.p. 132-134 ^{o}C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ (ppm) 7.26–7.36 (m, 4H), 7.38–7.43 (m, 2H), 7.51 (s, 1H), 7.60 (d, 1H, *J* = 8.4 Hz), 7.75–7.78 (m, 3H), 7.87 (d, 1H, *J* = 8.4 Hz); ^{13}C NMR ($CDCl_3$, 100 MHz): δ (ppm) 121.6, 123.6, 125.7, 126.5, 128.5, 129.0, 129.4, 130.4, 130.7, 130.9, 133.2, 135.4, 136.9, 137.4, 141.3, 153.5, 164.1, 196.1; IR (KBr): 3065, 3022, 2925, 2848, 1672, 1595, 1581, 1560, 1509, 1474, 1452, 1433, 1378, 1313, 1291, 1265, 1185, 1158, 1129, 1100, 1021, 1005, 968, 947, 877, 817, 782, 755 cm^{-1}; Anal. calcd for $C_{20}H_{12}ClNOS$: C 68.67, H 3.46, N 4.00; found: C 68.75, H 3.52, N 3.90.



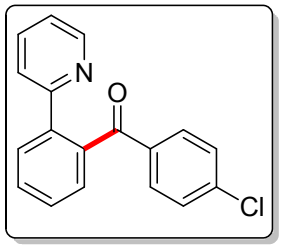
Phenyl(2-(pyridin-2-yl)phenyl)methanone (7a): Brown solid; M.p. 101-103 ^{o}C; ^{1}H NMR ($CDCl_3$, 600 MHz): δ (ppm) 6.99-7.01 (m, 1H), 7.25 (t, 1H, *J* = 7.2 Hz), 7.35-7.38 (m, 1H), 7.47 (d, 1H, *J* = 8.4 Hz), 7.50-7.56 (m, 4H), 7.58-7.61 (m, 1H), 7.68 (d, 2H, *J* = 7.8 Hz), 7.76 (d, 1H, *J* = 7.8 Hz), 8.36-8.37 (m, 1H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ (ppm) 122.1, 122.9, 128.2, 128.7, 129.0, 129.3, 127.7, 130.4, 132.5, 136.5, 138.1, 139.6, 139.8, 149.2, 156.9, 198.4; IR (KBr): 3061, 2926, 2854, 1666, 1587, 1469, 1452, 1438, 1426, 1283, 1247, 1151, 935, 755, 700 cm^{-1}; HRMS (ESI): calcd. for $C_{18}H_{13}NO(MH^+)$ 260.1070; found 260.1072.



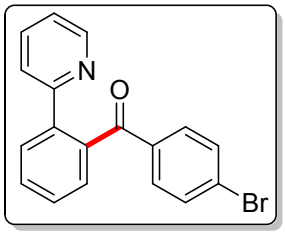
(2-(Pyridin-2-yl)phenyl)(p-tolyl)methanone (7b): Liquid; ^{1}H NMR ($CDCl_3$, 600 MHz): δ (ppm) 2.30 (s, 3H), 7.02-7.04 (m, 1H), 7.07 (d, 2H, *J* = 7.8 Hz), 7.46 (d, 1H, *J* = 7.8 Hz), 7.49-7.52 (m, 2H), 7.54-7.61 (m, 4H), 7.76 (d, 1H, *J* = 7.8 Hz), 8.41-8.42 (m, 1H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ (ppm) 21.8, 122.1, 123.2, 128.6, 128.9, 129.1, 129.2, 129.3, 129.9, 130.2, 130.3, 135.4, 136.5, 143.4, 149.2, 157.1, 198.1; IR (KBr): 3055, 2926, 1666, 1606, 1469, 1442, 1438, 1426, 1281, 1265, 1151, 935, 742 cm^{-1}; HRMS (ESI): calcd. for $C_{19}H_{15}NO(MH^+)$ 274.1226; foun274.1229 .



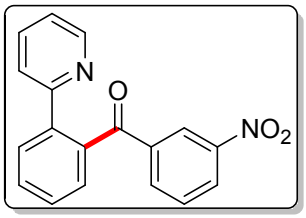
(4-Methoxyphenyl)(2-(pyridin-2-yl)phenyl)methanone (7c): Liquid; ^{1}H NMR ($CDCl_3$, 600 MHz): δ (ppm) 3.79 (s, 3H), 6.76 (d, 2H, *J* = 9.0 Hz), 7.03-7.05 (m, 1H), 7.46 (d, 1H, *J* = 7.8 Hz), 7.50 (d, 2H, *J* = 4.2 Hz), 7.54-7.59 (m, 2H), 7.68 (d, 2H, *J* = 8.4 Hz), 7.76 (d, 1H, *J* = 7.8 Hz), 8.41-8.42 (m, 1H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ (ppm) 55.5, 113.5, 122.1, 123.2, 128.6, 129.0, 129.2, 130.1, 130.9, 132.2, 136.4, 139.7, 139.9, 149.4, 157.3, 163.2, 197.2; IR (KBr): 3061, 2930, 2855, 1658, 1598, 1509, 1468, 1439, 1426, 1304, 1285, 1256, 1176, 1148, 1024, 930, 844, 753 cm^{-1}; HRMS (ESI): calcd. for $C_{19}H_{15}NO_2(MH^+)$ 290.1176; found 290.1180.



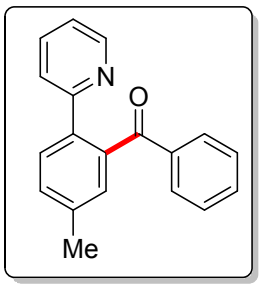
(4-Chlorophenyl)(2-(pyridin-2-yl)phenyl)methanone (7d): Brown solid; M.p. 84-86 ^{o}C; ^{1}H NMR ($CDCl_3$, 600 MHz): δ (ppm) 6.99-7.01 (m, 1H), 7.21 (d, 2H, *J* = 8.4 Hz), 7.49-7.51 (m, 3H), 7.55-7.59 (m, 2H), 7.60 (d, 2H, *J* = 8.4 Hz), 7.75 (d, 1H, *J* = 7.8 Hz), 8.31-8.32 (m, 1H); ^{13}C NMR ($CDCl_3$, 150 MHz): δ (ppm) 122.2, 122.5, 128.4, 128.7, 128.8, 129.1, 130.5, 130.8, 136.5, 136.6, 138.6, 139.1, 139.5, 149.0, 156.5, 197.1; IR (KBr): 2926, 2856, 1663, 1587, 1487, 1468, 1437, 1401, 1303, 1265, 1013, 928, 796, 753, 742 cm^{-1}; HRMS (ESI): calcd. for $C_{18}H_{12}ClNO(MH^+)$ 294.0680; found 294.0685.



(4-Bromophenyl)(2-(pyridin-2-yl)phenyl)methanone (7e): Yellowish solid; M.p. 94-96 ^{o}C; ^{1}H NMR ($CDCl_3$, 600 MHz): δ (ppm) 7.01-7.03 (m, 1H), 7.39 (d, 2H, *J* = 8.4 Hz), 7.49-7.55 (m, 5H), 7.57-7.61 (m, 2H), 7.76 (d, 1H, *J* = 7.8 Hz), 8.32-8.33 (m, 1H); ^{13}C NMR ($CDCl_3$, 150 MHz): δ (ppm) 122.3, 122.5, 127.4, 128.76, 128.82, 129.1, 130.5, 130.9, 131.5, 136.6, 137.0, 139.2, 139.6, 149.1, 156.5, 197.3; IR (KBr): 3049, 2926, 2856, 1664, 1584, 1482, 1468, 1437, 1397, 1302, 1282, 1264, 1176, 1151, 1068, 1010, 927, 795, 741 cm^{-1}; HRMS (ESI): calcd. for $C_{18}H_{12}BrNO(MH^+)$ 338.0175; found 338.0183.

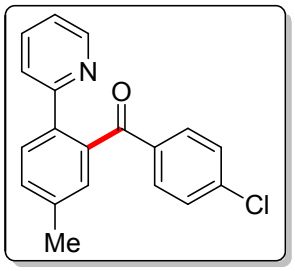


(3-Nitrophenyl)(2-(pyridin-2-yl)phenyl)methanone (7f): Liquid; ^{1}H NMR ($CDCl_3$, 600 MHz): δ (ppm) 6.97-6.99 (m, 1H), 7.44 (t, 1H, *J* = 7.8 Hz), 7.55-7.56 (m, 2H), 7.60-7.61 (m, 1H), 7.63-7.66 (m, 2H), 7.79 (d, 1H, *J* = 7.8 Hz), 7.99 (d, 1H, *J* = 7.8 Hz), 8.19 (d, 1H, *J* = 7.8 Hz), 8.23 (d, 1H, *J* = 4.8 Hz), 8.43 (s, 1H); ^{13}C NMR ($CDCl_3$, 150 MHz): δ (ppm) 122.2, 122.4, 123.8, 126.4, 128.6, 129.2, 129.4, 131.0, 134.6, 136.9, 138.4, 139.5, 140.0, 148.1, 148.8, 156.0, 195.7; IR (KBr): 3082, 2926, 2856, 1674, 1612, 1586, 1530, 1470, 1440, 1348, 1298, 1281, 1252, 1087, 972, 754, 708 cm^{-1}; HRMS (ESI): calcd. for $C_{18}H_{12}N_2O_3(MH^+)$ 305.0921; found 305.0924.

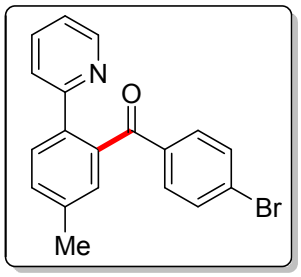


(5-Methyl-2-(pyridin-2-yl)phenyl)(phenyl)methanone (8a): Brown solid; M.p. 132-134 ^{o}C; ^{1}H NMR ($CDCl_3$, 600 MHz): δ (ppm) 2.44 (s, 3H), 6.94-6.96 (m, 1H), 7.24 (t, 2H, *J* = 7.8 Hz), 7.33-7.36 (m,

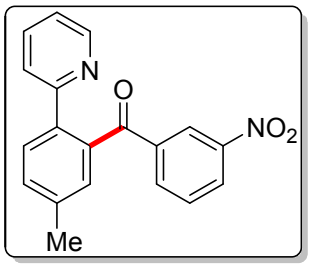
2H), 7.39 (d, 1H, *J* = 7.8 Hz), 7.45 (d, 1H, *J* = 7.8 Hz), 7.49-7.52 (m, 1H), 7.65-7.68 (m, 3H), 8.31-8.32 (m, 1H); ^{13}C NMR ($CDCl_3$, 150 MHz): δ (ppm) 21.3, 121.8, 122.6, 128.1, 128.7, 129.6, 129.8, 131.0, 132.4, 136.3, 136.9, 138.2, 138.8, 139.6, 149.1, 156.9, 198.6; IR (KBr): 2923, 2854, 1668, 1588, 1469, 1428, 1317, 1300, 1286, 1248, 1210, 837, 790, 750, 702 cm^{-1}; HRMS (ESI): calcd. for $C_{19}H_{15}NO(MH^+)$ 274.1226; found 274.1233.



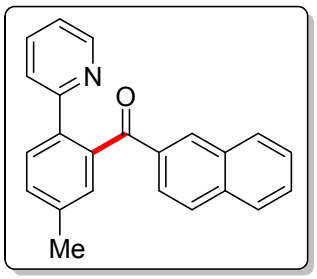
(4-Chlorophenyl)(5-methyl-2-(pyridin-2-yl)phenyl)methanone (8d): Brown solid; M.p. 95-97 ^{o}C; ^{1}H NMR ($CDCl_3$, 600 MHz): δ (ppm) 2.43 (s, 3H), 6.96-6.98 (m, 1H), 7.20 (d, 2H, *J* = 8.4 Hz), 7.31 (s, 1H), 7.39 (d, 1H, *J* = 8.4 Hz), 7.48 (d, 1H, *J* = 7.8 Hz), 7.52-7.55 (m, 1H), 7.60 (d, 2H, *J* = 8.4 Hz), 7.65 (d, 1H, *J* = 7.8 Hz), 8.28-8.29 (m, 1H); ^{13}C NMR ($CDCl_3$, 150 MHz): δ (ppm) 21.2, 121.9, 122.2, 128.4, 128.5, 129.6, 130.7, 131.1, 136.5, 136.6, 136.7, 138.5, 138.9, 139.1, 148.9, 156.4, 197.2; IR (KBr): 3057, 2921, 2856, 1664, 1587, 1470, 1431, 1402, 1307, 1287, 1250, 1211, 1089, 1013, 967, 847, 835, 823, 788, 762 cm^{-1}; HRMS (ESI): calcd. for $C_{19}H_{14}ClNO(MH^+)$ 308.0837; found 308.0844.



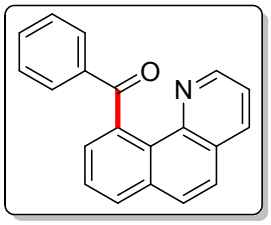
(4-Bromophenyl)(5-methyl-2-(pyridin-2-yl)phenyl)methanone (8e): Yellow solid; M.p. 90-92 ^{o}C; ^{1}H NMR ($CDCl_3$, 600 MHz): δ (ppm) 2.44 (s, 3H), 6.98-7.00 (m, 1H), 7.31 (s, 1H), 7.37-7.41 (m, 3H), 7.49 (d, 1H, *J* = 7.2 Hz), 7.53 (d, 2H, *J* = 8.4 Hz), 7.55-7.58 (m, 1H), 7.66 (d, 1H, *J* = 7.8 Hz), 8.30-8.31 (m, 1H); ^{13}C NMR ($CDCl_3$, 150 MHz): δ (ppm) 21.4, 122.0, 122.3, 127.3, 128.6, 129.7, 130.9, 131.2, 131.5, 136.6, 136.8, 137.2, 139.1, 139.2, 149.1, 156.5, 197.6; IR (KBr): 3057, 2921, 2852, 1666, 1585, 1470, 1431, 1396, 1304, 1285, 1250, 1208, 1172, 1067, 1008, 967, 845, 787, 759 cm^{-1}; HRMS (ESI): calcd. For $C_{19}H_{14}BrNO(MH^+)$ 352.0332; found 352.0322.



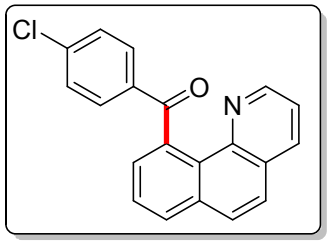
(5-Methyl-2-(pyridin-2-yl)phenyl)(3-nitrophenyl)methanone (8f): Liquid; ^{1}H NMR ($CDCl_3$, 600 MHz): δ (ppm) 2.47 (s, 3H), 6.94-6.97 (m, 1H), 7.36 (s, 1H), 7.44-7.46 (m, 2H), 7.56-7.59 (m, 2H), 7.70 (d, 1H, *J* = 7.8 Hz), 8.01 (d, 1H, *J* = 7.2 Hz), 8.18 (d, 1H, *J* = 7.8 Hz), 8.21 (d, 1H, *J* = 4.2 Hz), 8.41-8.42 (m, 1H); ^{13}C NMR ($CDCl_3$, 150 MHz): δ (ppm) 21.4, 121.9, 122.2, 123.8, 126.3, 128.4, 129.3, 129.9, 131.7, 134.6, 136.7, 136.9, 138.4, 139.6, 140.2, 148.2, 148.8, 155.9, 195.9; IR (KBr): 3082, 2926, 2856, 1673, 1611, 1588, 1531, 1468, 1430, 1349, 1303, 1250, 1209, 1086, 990, 830, 789, 774, 733 cm^{-1}; HRMS (ESI): calcd. for $C_{19}H_{14}N_2O_3(MH^+)$ 319.1077; found 319.1074.



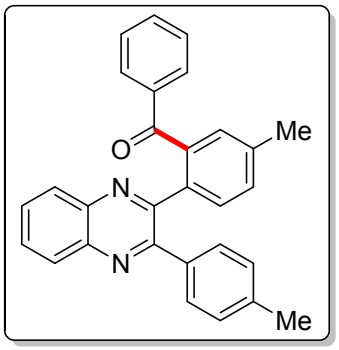
(5-Methyl-2-(pyridin-2-yl)phenyl)(naphthalen-2-yl)methanone (8g): Gummy; ^{1}H NMR ($CDCl_3$, 600 MHz): δ (ppm) 2.13 (s, 3H), 6.88-6.90 (m, 1H), 7.39 (s, 1H), 7.43 (d, 2H, *J* = 7.8 Hz), 7.46-7.53 (m, 3H), 7.71-7.79 (m, 4H), 7.90-7.93 (m, 1H), 8.07 (s, 1H), 8.28-8.29 (m, 1H); ^{13}C NMR ($CDCl_3$, 150 MHz): δ (ppm) 21.4, 121.8, 122.5, 125.2, 126.6, 127.8, 128.3, 128.5, 128.9, 129.7, 129.9, 131.1, 131.6, 132.5, 135.4, 135.7, 136.4, 137.1, 138.9, 139.8, 149.1, 156.9, 198.7; IR (KBr): 3054, 2923, 2852, 1662, 1625, 1587, 1466, 1428, 1351, 1289, 1232, 1187, 1111, 827, 778, 763 cm^{-1}; HRMS (ESI): calcd. for $C_{23}H_{17}NO$ (MH^+) 324.1383; found 324.1388.



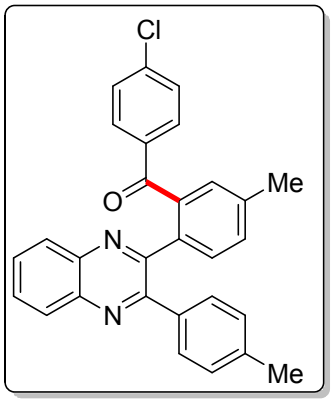
Benzo[*h*]quinolin-10-yl(phenyl)methanone (9a): Yellowish solid; M.p. 132-134 ^{o}C; ^{1}H NMR ($CDCl_3$, 600 MHz): δ (ppm) 7.28-7.32 (m, 3H), 7.40 (t, 1H, *J* = 7.8 Hz), 7.63 (d, 1H, *J* = 7.2 Hz), 7.72 (d, 1H, *J* = 8.4 Hz), 7.72-7.79 (m, 3H), 7.88 (d, 1H, *J* = 8.4 Hz), 8.04 (d, 1H, *J* = 8.4 Hz), 8.07-8.08 (m, 1H), 8.49-8.50 (m, 1H); ^{13}C NMR ($CDCl_3$, 150 MHz): δ (ppm) 121.8, 126.3, 126.6, 127.1, 127.87, 127.94, 128.2, 128.9, 129.1, 129.3, 131.9, 133.9, 135.4, 139.1, 139.4, 144.8, 147.2, 198.7; IR (KBr): 3059, 2928, 2854, 1672, 1578, 1510, 1448, 1421, 1314, 1273, 1212, 1175, 890, 840, 759, 731, 705 cm^{-1}; HRMS (ESI): calcd. for $C_{20}H_{13}NO(MH^+)$ 284.1070; found 284.1076.



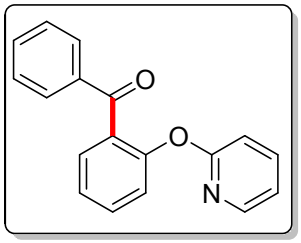
Benzo[*h*]quinolin-10-yl(4-chlorophenyl)methanone (9d): Yellowish solid; M.p. 155-157 ^{o}C; ^{1}H NMR ($CDCl_3$, 600 MHz): δ (ppm) 7.24 (d, 2H, *J* = 8.4 Hz), 7.30-7.32 (m, 1H), 7.59 (d, 1H, *J* = 7.2 Hz), 7.66 (d, 2H, *J* = 8.4 Hz), 7.70-7.72 (m, 1H), 7.45-7.77 (m, 1H), 7.86-7.87 (m, 1H), 8.02 (d, 1H, *J* = 8.4 Hz), 8.07 (d, 1H, *J* = 7.8 Hz), 8.468-8.473 (m, 1H); ^{13}C NMR ($CDCl_3$, 150 MHz): δ (ppm) 121.9, 126.3, 126.5, 127.2, 127.9, 128.5, 129.2, 129.4, 130.1, 133.9, 135.5, 137.9, 138.0, 138.5, 144.6, 147.2, 197.4; IR (KBr): 3059, 2928, 2854, 1668, 1587, 1510, 1483, 1422, 1395, 1302, 1267, 1207, 1169, 1088, 1002, 894, 835, 765, 748 cm^{-1}; HRMS (ESI): calcd. for $C_{20}H_{12}ClNO(MH^+)$ 318.068; found 318.064.



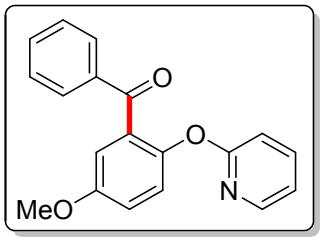
(5-Methyl-2-(3-(p-tolyl)quinoxalin-2-yl)phenyl)(phenyl)methanone (10a): Gummy; ^{1}H NMR ($CDCl_3$, 400 MHz): δ (ppm) 2.27 (s, 3H), 2.39 (s, 3H), 6.93 (d, 2H, *J* = 8.0 Hz), 7.22 (s, 1H), 7.25-7.29 (m, 4H), 7.38-7.44 (m, 4H), 7.55 (d, 1H, *J* = 7.6 Hz), 7.64-7.71 (m, 2H), 7.98 (d, 1H, *J* = 7.2 Hz), 8.07 (d, 1H, *J* = 8.4 Hz); ^{13}C NMR ($CDCl_3$, 100 MHz): δ (ppm) 21.1, 21.3, 127.8, 128.9, 129.1, 129.2, 129.5, 129.7, 130.0, 130.3, 130.6, 131.5, 131.9, 132.4, 135.7, 137.1, 137.9, 138.2, 138.7, 138.8, 140.9, 141.3, 153.5, 153.7, 196.5; IR (KBr): 3036, 2924, 2858, 1716, 1660, 1587, 1449, 1400, 1343, 1316, 1271, 1211, 1177, 1121, 1050, 979, 824, 762, 704 cm^{-1}; HRMS (ESI): calcd. for $C_{29}H_{22}N_2O(MH^+)$ 415.1805; found 415.1811.



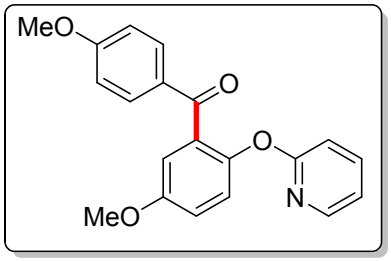
(4-Chlorophenyl)(5-methyl-2-(3-(p-tolyl)quinoxalin-2-yl)phenyl)methanone (10d): Gummy; ^{1}H NMR ($CDCl_3$, 400 MHz): δ (ppm) 2.29 (s, 3H), 2.41 (s, 3H), 6.95 (d, 2H, *J* = 7.6 Hz), 7.18 (s, 1H), 7.26 (t, 3H, *J* = 8.8 Hz), 7.31-7.33 (m, 2H), 7.35 (s, 1H), 7.42 (d, 1H, *J* = 7.6 Hz), 7.59 (d, 1H, *J* = 8.0 Hz), 7.68-7.73 (m, 2H), 7.98-8.00 (m, 1H), 8.09-8.11 (m, 1H); ^{13}C NMR ($CDCl_3$, 150 MHz): δ (ppm) 21.4, 21.5, 127.6, 128.2, 129.0, 129.1, 129.2, 129.4, 129.7, 129.9, 130.4, 131.5, 131.8, 132.3, 135.5, 135.8, 138.3, 138.5, 138.9, 141.1, 141.4, 153.5, 153.6, 195.4; IR (KBr): 2985, 2923, 2856, 1660, 1606, 1588, 1456, 1400, 1343, 1285, 1267, 1180, 1121, 1089, 1048, 1014, 997, 824, 761 cm^{-1}; HRMS (ESI): calcd. for $C_{29}H_{21}ClN_2O$ (MH^+) 449.1415; found 449.1415.



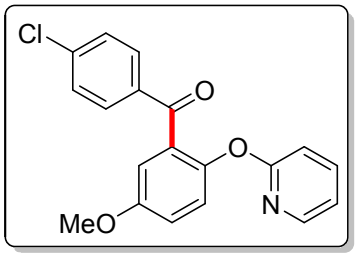
Phenyl(2-(pyridin-2-yloxy)phenyl)methanone (11a): ^{1}H NMR ($CDCl_3$, 400 MHz): δ (ppm) 6.59 (d, 1H, *J* = 8.0 Hz), 6.84-6.87 (m, 1H), 7.26 (d, 1H, *J* = 7.6 Hz), 7.32 (t, 3H, *J* = 8.0 Hz), 7.44-7.51 (m, 2H), 7.55 (d, 2H, *J* = 7.2 Hz), 7.75 (d, 2H, *J* = 7.2 Hz), 7.99-8.01 (m, 1H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ (ppm) 111.6, 118.6, 122.9, 124.8, 128.2, 129.87, 129.95, 130.4, 132.4, 132.9, 137.7, 139.5, 147.1, 151.8, 163.1, 195.5; IR (KBr): 3063, 2924, 2854, 1666, 1596, 1572, 1466, 1448, 1427, 1290, 1265, 1206, 1145, 1103, 1026, 989, 931, 885, 760, 700 cm^{-1}; HRMS (ESI): calcd. for $C_{18}H_{13}NO_2$ (MH^+) 276.1019; found 276.1027.



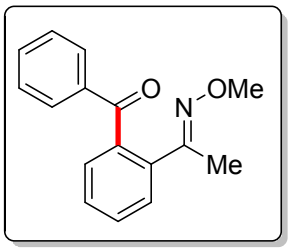
(5-Methoxy-2-(pyridin-2-yloxy)phenyl)(phenyl)methanone (12a): ^{1}H NMR ($CDCl_3$, 400 MHz): δ (ppm) 3.83 (s, 3H), 6.51 (d, 1H, *J* = 8.4 Hz), 6.82-6.85 (m, 1H), 7.07-7.12 (m, 2H), 7.19 (d, 1H, *J* = 8.8 Hz), 7.31 (t, 2H, *J* = 7.6 Hz), 7.44-7.49 (m, 2H), 7.74 (d, 2H, *J* = 8.4 Hz), 7.99-8.01 (m, 1H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ (ppm) 55.9, 111.3, 114.6, 118.3, 118.4, 124.3, 128.2, 129.9, 132.9, 133.1, 137.6, 139.3, 145.0, 147.1, 156.5, 163.5, 195.2; IR (KBr): 3059, 2929, 2854, 1667, 1595, 1492, 1428, 1286, 1268, 1201, 1142, 1036, 878, 779, 701 cm^{-1}; HRMS (ESI): calcd. for $C_{19}H_{15}NO_3$ (MH^+) 306.1125; found 306.1125.



(5-Methoxy-2-(pyridin-2-yloxy)phenyl)(4-methoxyphenyl)methanone (12c): ^{1}H NMR ($CDCl_3$, 400 MHz): δ (ppm) 3.81 (s, 3H), 3.82 (s, 3H), 6.59 (d, 1H, *J* = 8.8 Hz), 6.81 (d, 2H, *J* = 9.2 Hz), 6.94 (d, 1H, *J* = 8.8 Hz), 7.01-7.02 (m, 1H), 7.06-7.09 (m, 1H), 7.18 (d, 1H, *J* = 8.8 Hz), 7.49 (t, 1H, *J* = 8.6 Hz), 7.76 (d, 2H, *J* = 8.8 Hz), 8.02-8.04 (m, 1H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ (ppm) 55.6, 55.9, 113.3, 113.5, 114.4, 117.7, 118.4, 124.1, 130.3, 132.5, 133.6, 139.4, 144.7, 147.2, 156.5, 163.6, 163.7, 193.8; IR (KBr): 3061, 2934, 2838, 1659, 1598, 1572, 1510, 1492, 1465, 1427, 1258, 1201, 1169, 1031, 847, 775 cm^{-1}; HRMS (ESI): calcd. for $C_{20}H_{17}NO_4$ (MH^+) 336.1230; found 306.1235.

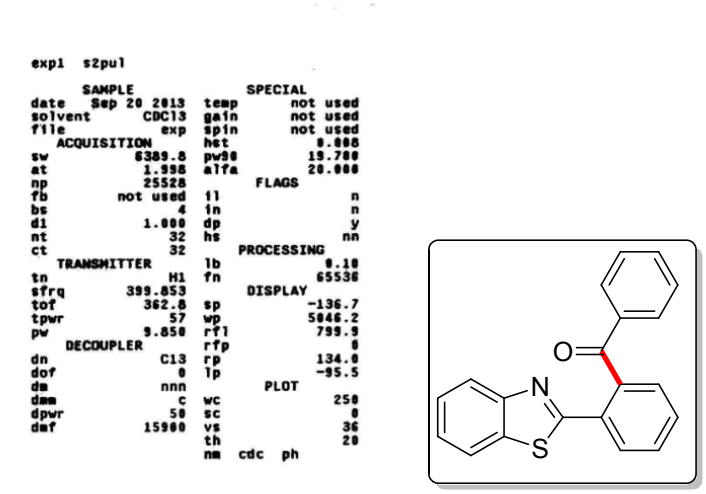


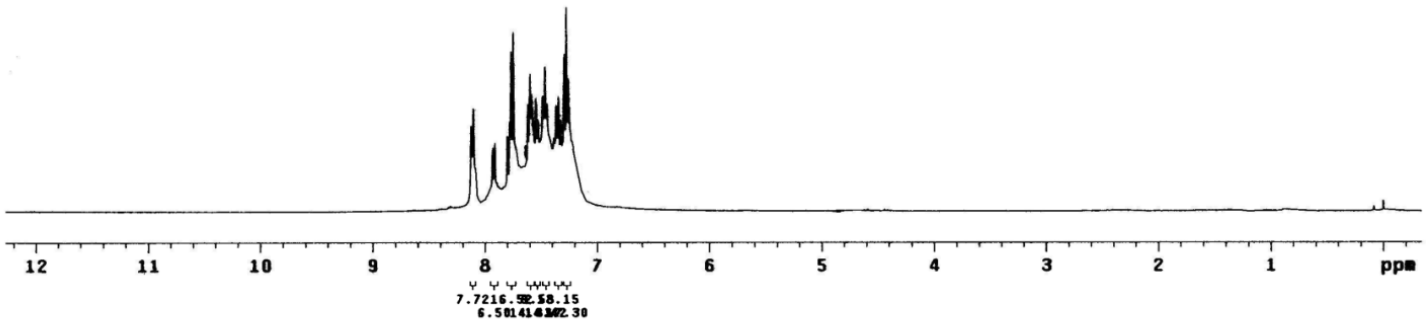
(4-Chlorophenyl)(5-methoxy-2-(pyridin-2-yloxy)phenyl)methanone (12d): ^{1}H NMR ($CDCl_3$, 400 MHz): δ (ppm) 3.83 (s, 3H), 6.54 (d, 1H, *J* = 8.4 Hz), 6.85-6.88 (m, 1H), 7.05 (d, 1H, *J* = 3.2 Hz), 7.09-7.12 (m, 1H), 7.18 (d, 1H, *J* = 8.8 Hz), 7.28 (d, 2H, *J* = 8.0 Hz), 7.48-7.52 (m, 1H), 7.68 (d, 2H, *J* = 8.4 Hz), 7.99-8.01 (m, 1H); ^{13}C NMR ($CDCl_3$, 100 MHz): δ (ppm) 55.9, 111.2, 114.5, 114.9, 118.5, 124.3, 128.5, 131.3, 132.7, 135.9, 139.4, 139.5, 144.9, 147.1, 156.6, 163.3, 194.1; IR (KBr): 3063, 2931, 2838, 1669, 1592, 1488, 1465, 1428, 1268, 1233, 1201, 1142, 1090, 1036, 1014, 966, 882, 849, 775 cm^{-1}; HRMS (ESI): calcd. for $C_{19}H_{14}ClNO_3$ (MH^+) 340.0735; found 340.0741.



(E)-(2-(1-(Methoxyimino)ethyl)phenyl)(phenyl)methanone (13a): Yellow solid; M.p. 100-102 ^{o}C; ^{1}H NMR ($CDCl_3$, 400 MHz): δ (ppm) 2.01 (s, 3H), 3.65 (s, 3H), 7.38 (t, 2H, J = 7.6 Hz), 7.44-7.47 (m, 2H), 7.48-7.53 (m, 3H), 7.69 (d, 2H, J = 7.6 Hz); ^{13}C NMR ($CDCl_3$, 100 MHz): δ (ppm) 14.6, 61.8, 127.9, 128.4, 128.8, 129.2, 129.5, 130.4, 132.7, 136.6, 138.4, 139.1, 154.2, 197.8; IR (KBr): 3060, 2979, 2934, 2927, 1666, 1597, 1448, 1366, 1313, 1285, 1249, 1046, 927, 896, 762, 701, 644 cm^{-1}; HRMS (ESI): calcd. for $C_{16}H_{15}NO_2$ (MH^+) 254.1176; found 254.1184.

(2-(Benzo[*d*]thiazol-2-yl)phenyl)(phenyl)methanone (1a): **^{1}H NMR ($CDCl_3$, 400 MHz)**

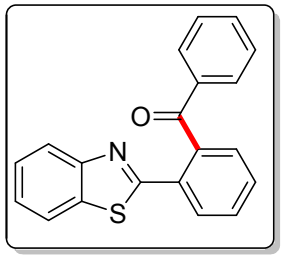


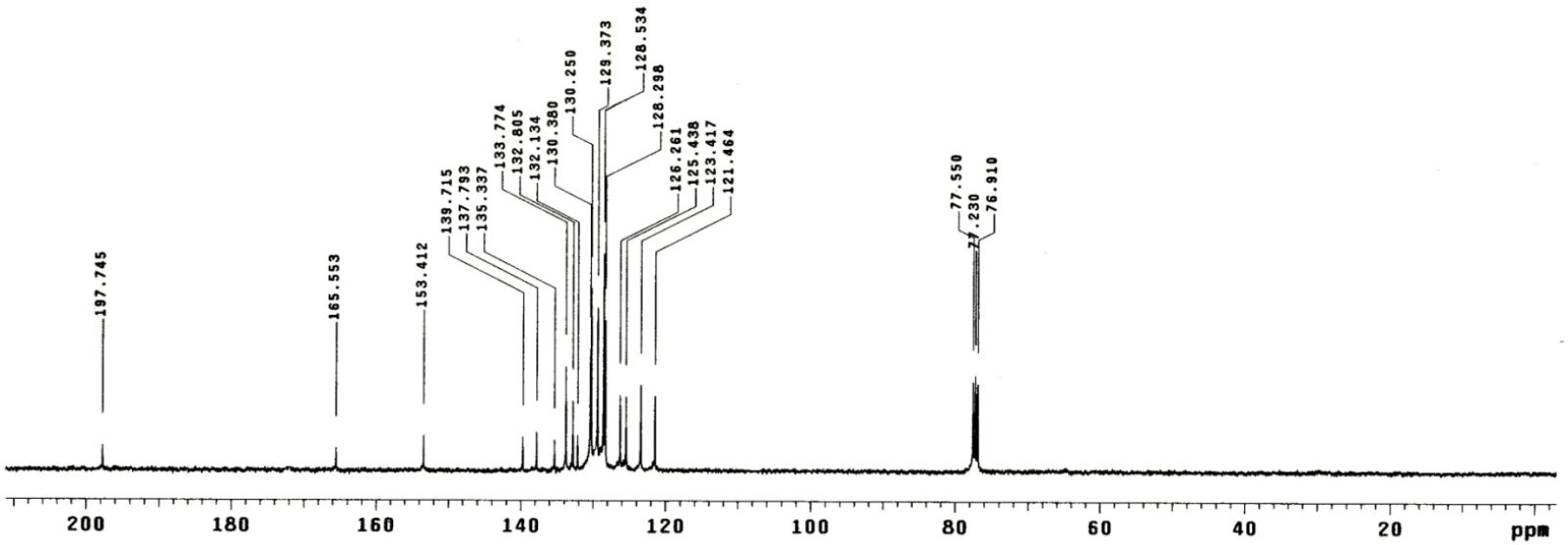


2-(Benzo[*d*]thiazol-2-yl)phenyl)(phenyl)methanone (1a): **^{13}C NMR ($CDCl_3$, 100 MHz)**

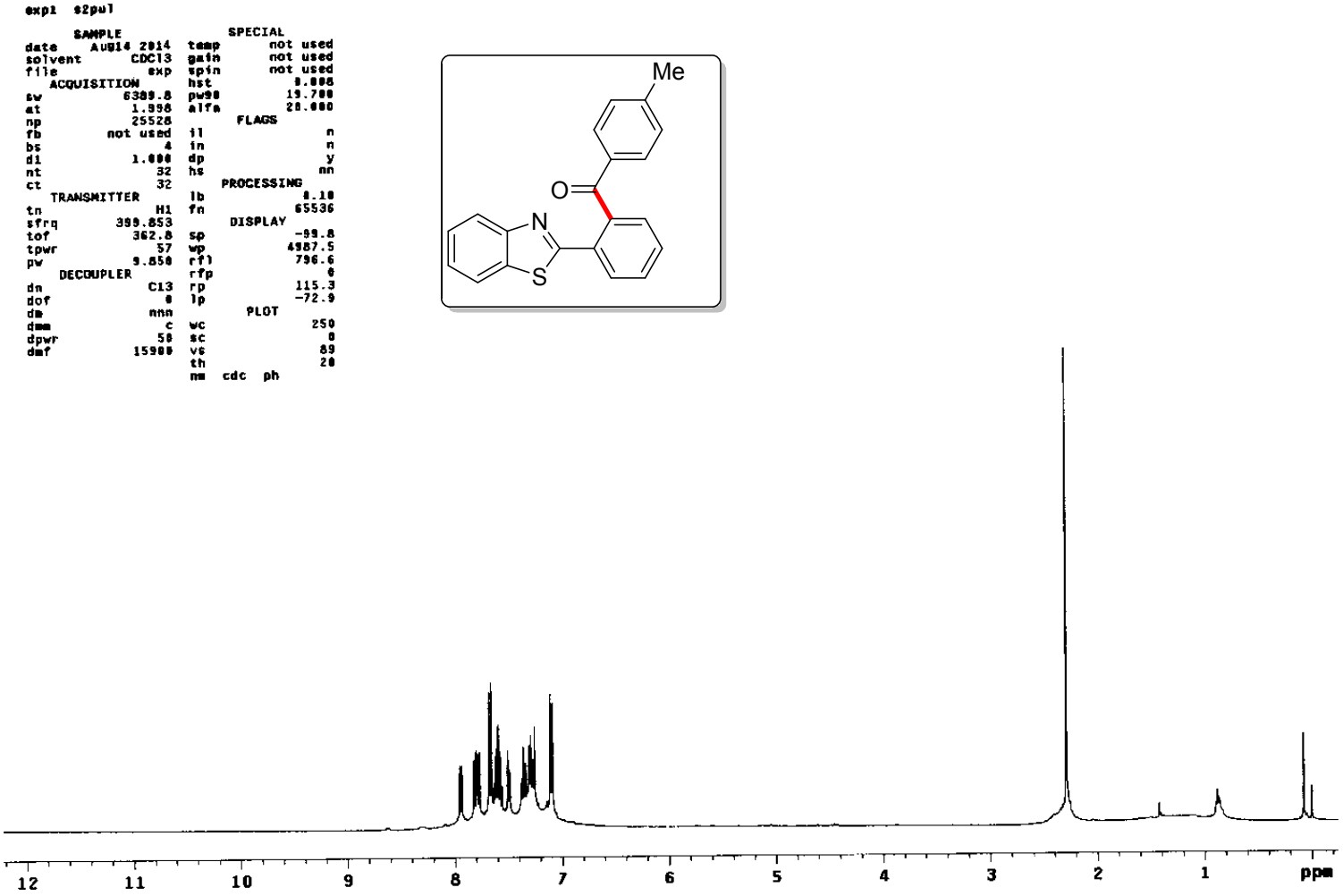
```
exp1  s2pul

      SAMPLE                 SPECIAL
date    Sep 21 2013   temp        not used
solvent       CDCl3   gain        not used
file            exp   spin        not used
   ACQUISITION        hst           0.008
sw          25125.6   pw90         18.600
at            1.199   alfa         20.000
np            60270          FLAGS
fb            13800   il                n
bs               32   in                n
d1            1.000   dp                y
nt             3000   hs               nn
ct             1248          PROCESSING
   TRANSMITTER        lb             2.00
tn               C13   fn            65536
sfrq        100.554          DISPLAY
tof          1536.3   sp          -301.0
tpwr             61   wp         21526,3
pw            9.300   rfl         9287.4
    DECOUPLER         rfp         7764.9
dn               H1   rp           -36.0
dof               0   lp          -356.1
dm              yyy            PLOT
dmm               w   wc             250
dpwr             42   sc               0
dmf            8900   vs              35
                      th               2
                      nm  no  ph
```

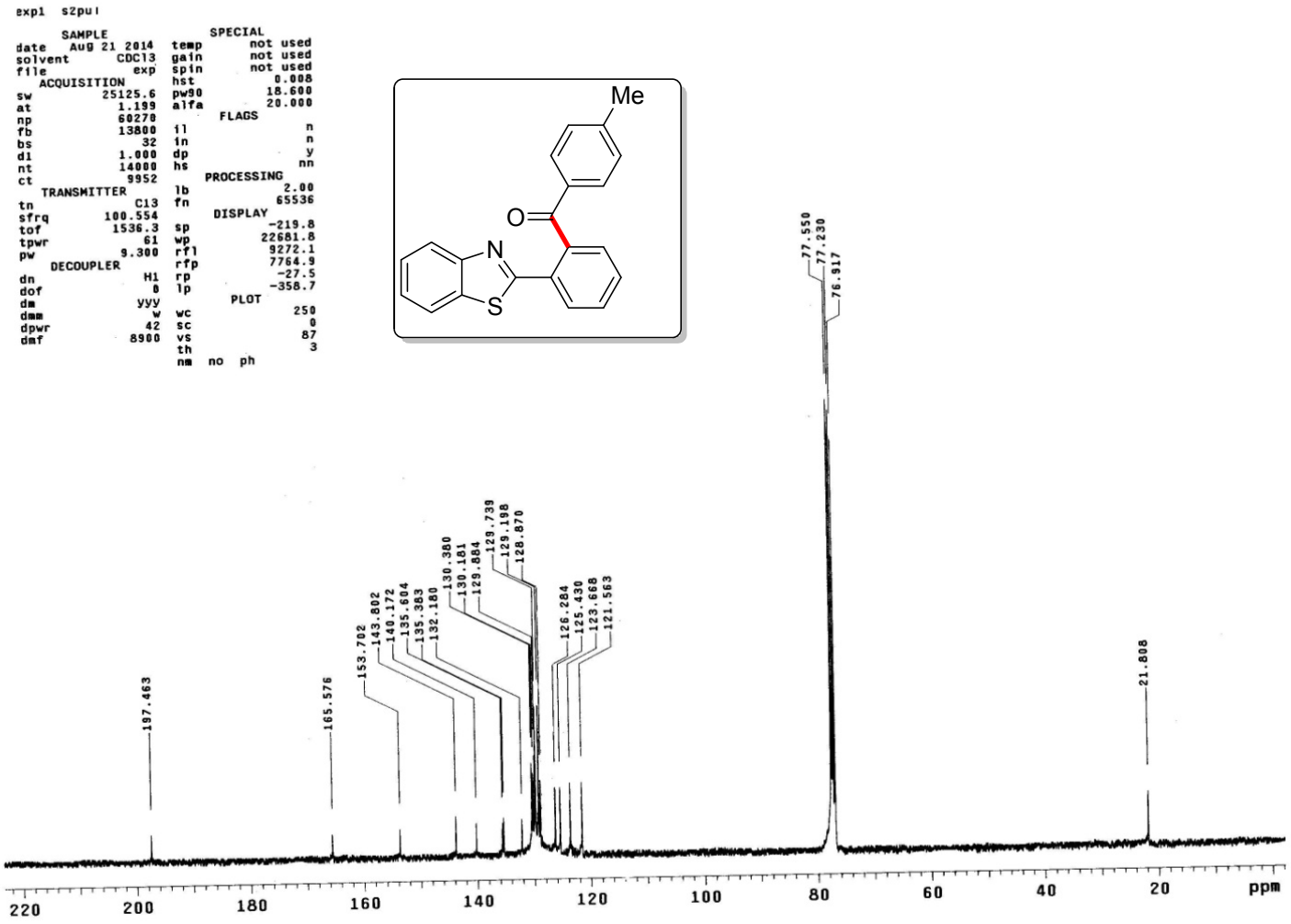




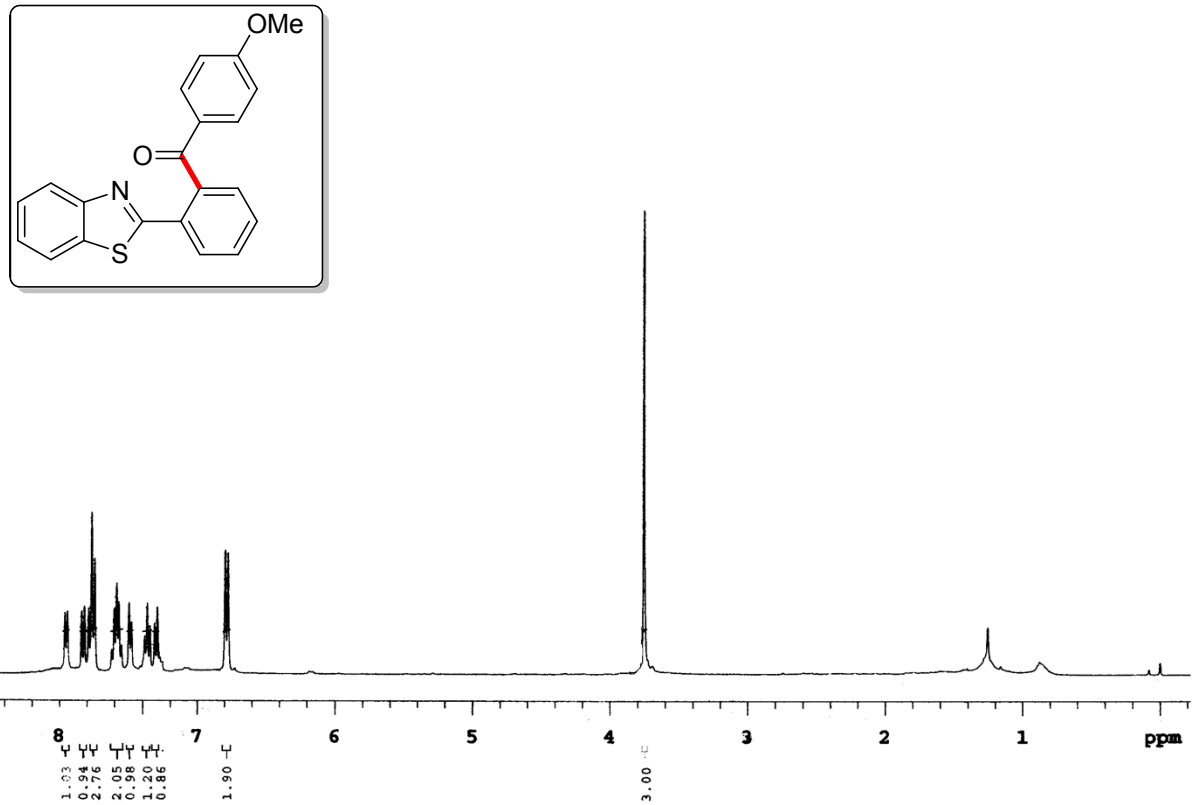
(2-(Benzo[*d*]thiazol-2-yl)phenyl)(p-tolyl)methanone (1b): **^{1}H NMR ($CDCl_3$, 400 MHz)**



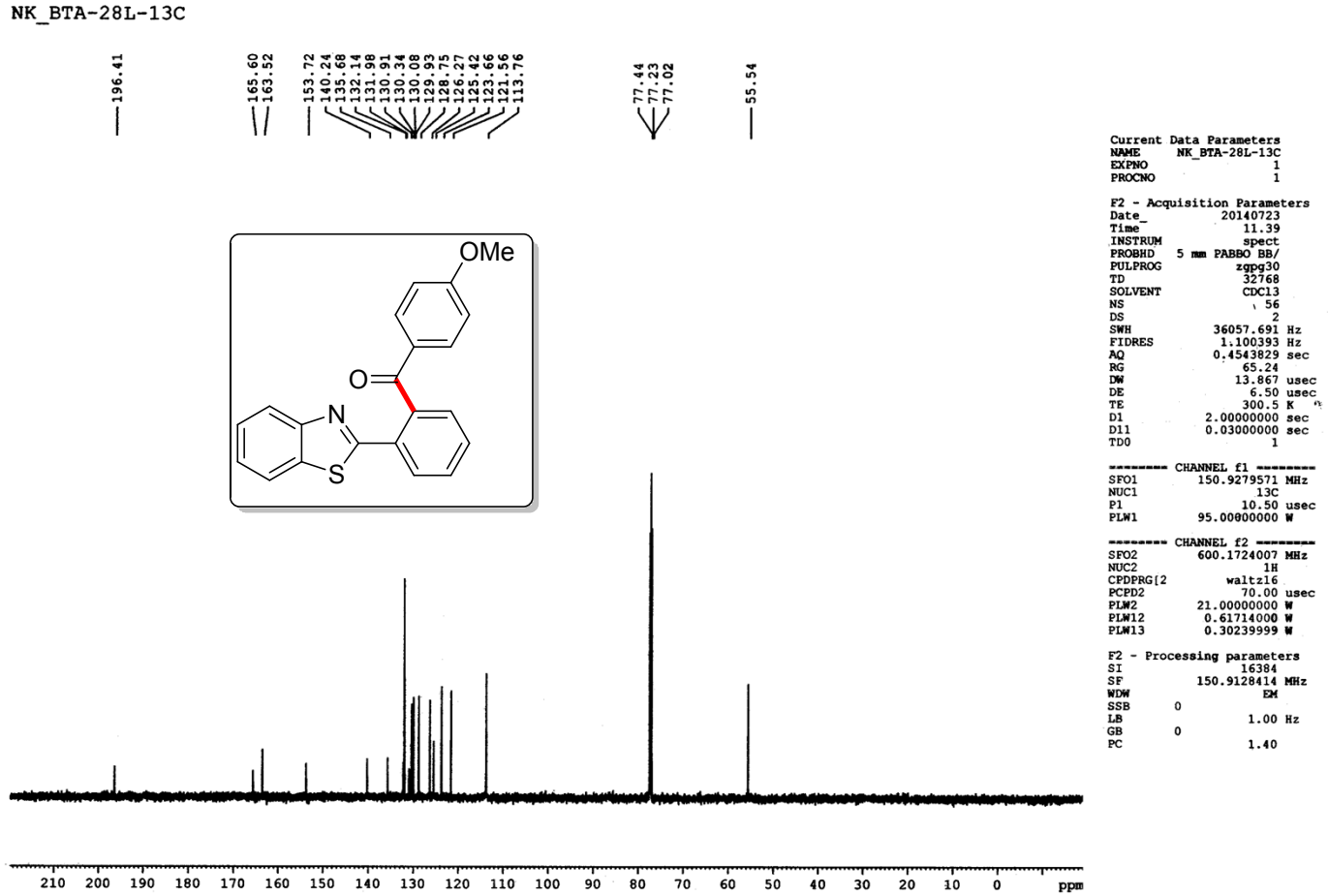
(2-(Benzo[*d*]thiazol-2-yl)phenyl)(p-tolyl)methanone (1b): **^{13}C NMR ($CDCl_3$, 100 MHz)**



(2-(Benzo[*d*]thiazol-2-yl)phenyl)(4-methoxyphenyl)methanone (1c): **^{1}H NMR ($CDCl_3$, 400 MHz)**



(2-(Benzo[*d*]thiazol-2-yl)phenyl)(4-methoxyphenyl)methanone (1c): ^{13}C NMR ($CDCl_3$, 150 MHz)



(2-(Benzo[*d*]thiazol-2-yl)phenyl)(4-chlorophenyl)methanone (1d): **^{1}H NMR ($CDCl_3$, 400 MHz)**

```
exp1  std1h

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date    Aug 25 2014   temp        not used
solvent       CDCl3   gain        not used
file            exp   spin        not used
   ACQUISITION        hst            0.008
sw            6006.0  pw90          19.700
at             1.995  alfa          20.000
np            23964           FLAGS
fb        not used    il                n
bs               4    in                n
d1           1.000    dp                y
nt              32    hs               nn
ct              32        PROCESSING
   TRANSMITTER        fn        not used
tn               H1       DISPLAY
sfrq        399.853    sp            -65.6
tof              0    wp          4190.6
tpwr            57    rfl          965.3
pw           7.000    rfp              0
    DECOUPLER         rp           106.0
dn              C13    lp           -63.7
dof              0          PLOT
dm             nnn    wc             250
dmm              c    sc               0
dpwr            50    vs              46
dmf          15900    th              20
                      nm  cdc  ph
```
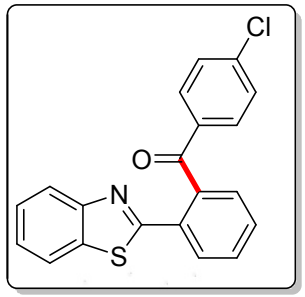
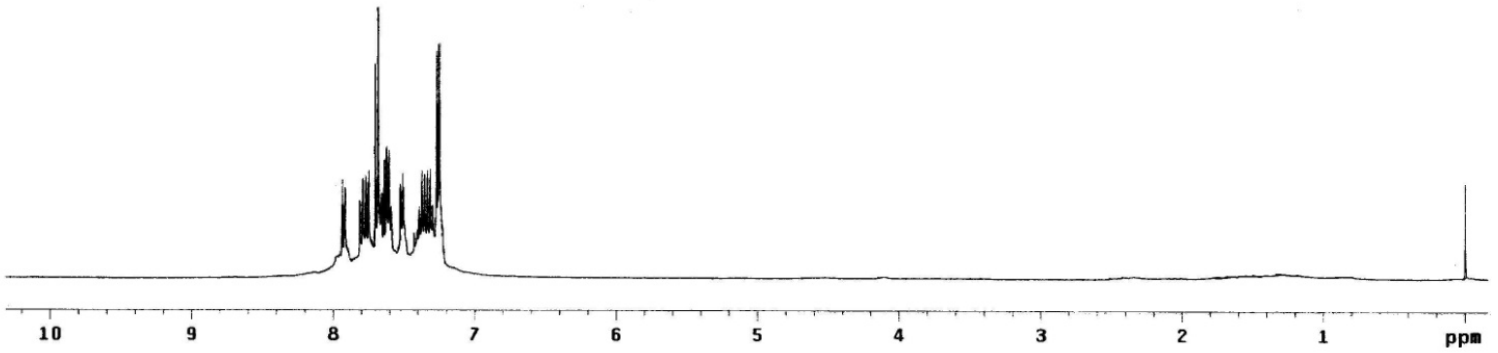
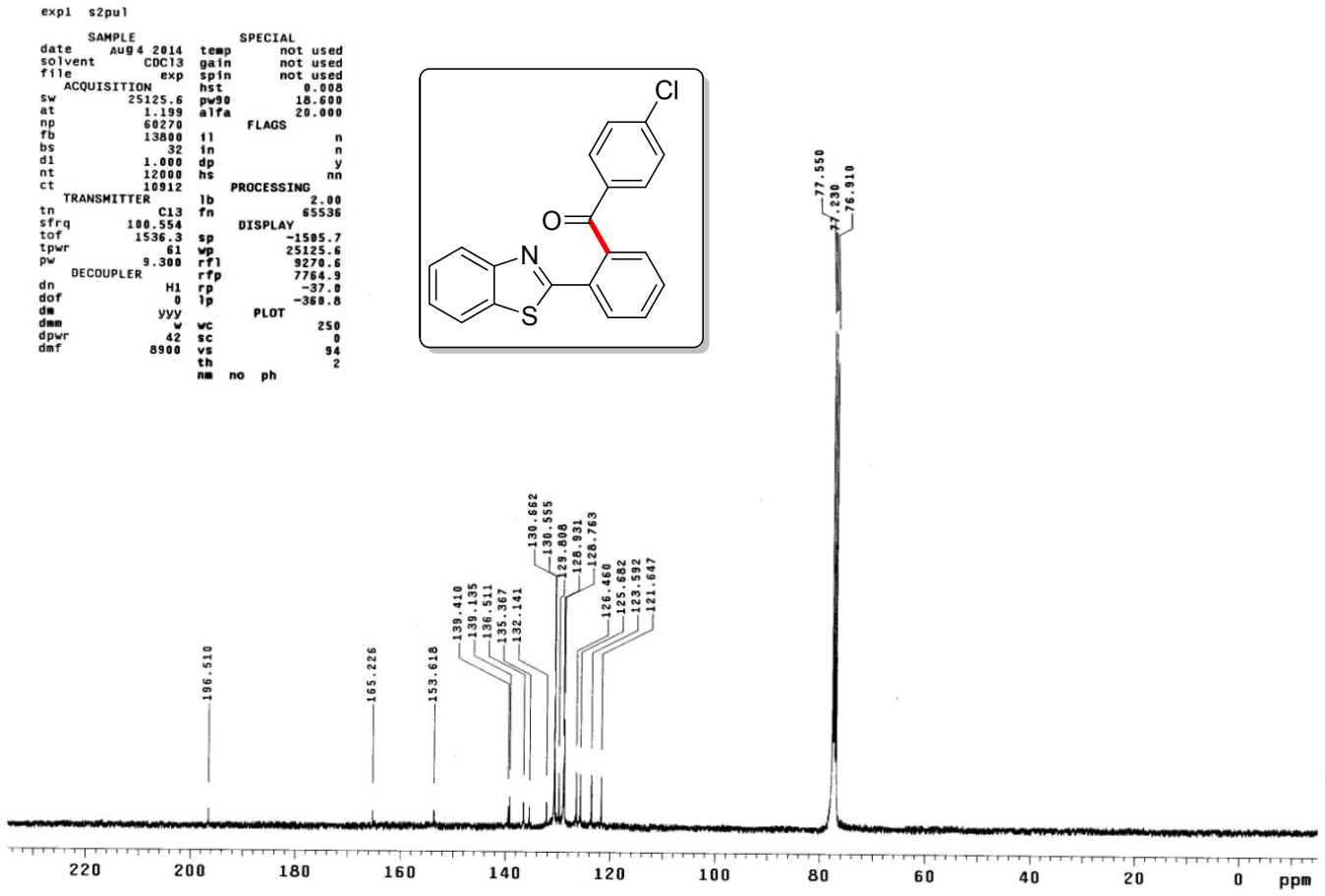
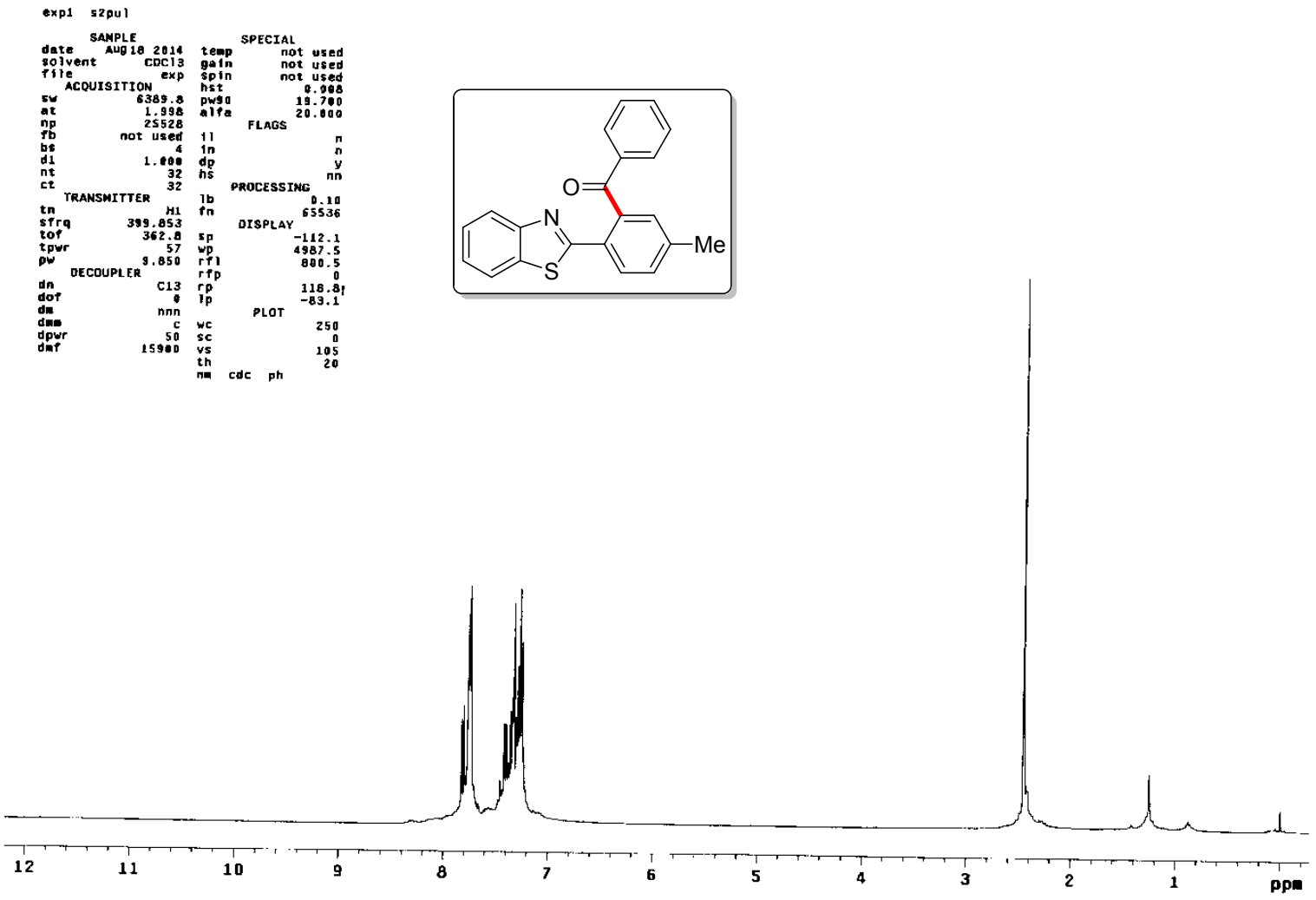





(2-(Benzo[*d*]thiazol-2-yl)phenyl)(4-chlorophenyl)methanone (1d): **^{13}C NMR ($CDCl_3$, 100 MHz)**

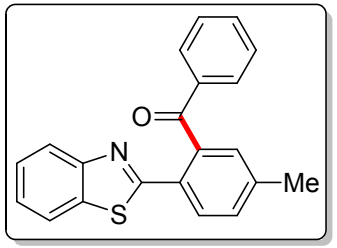


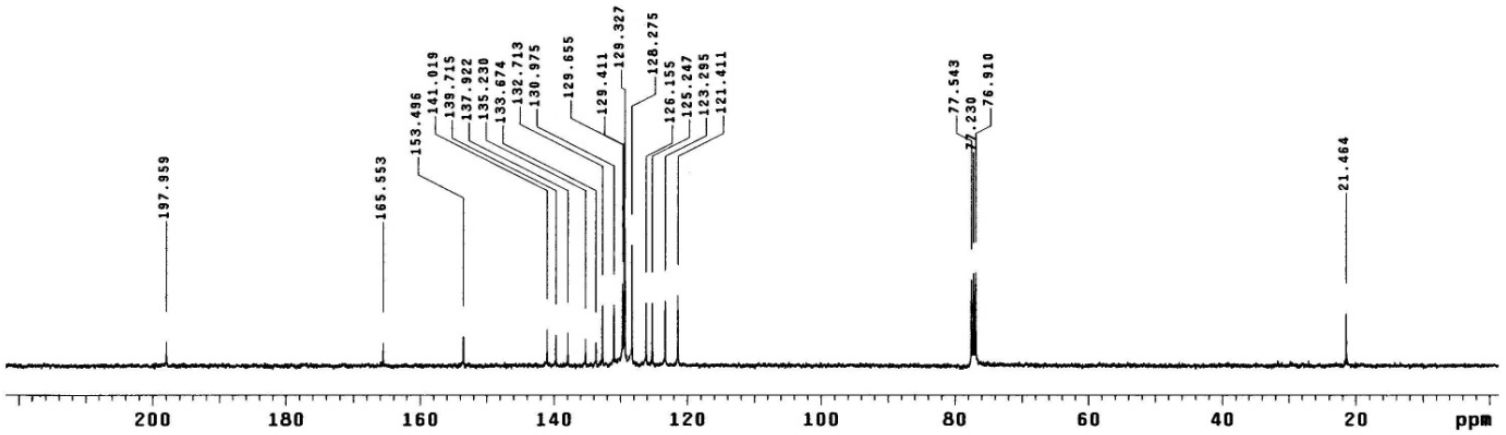
(2-(Benzo[*d*]thiazol-2-yl)-5-methylphenyl)(phenyl)methanone (2a): ^{1}H NMR ($CDCl_3$, 400 MHz)



(2-(Benzo[*d*]thiazol-2-yl)-5-methylphenyl)(phenyl)methanone (2a): **^{13}C NMR ($CDCl_3$, 100 MHz)**

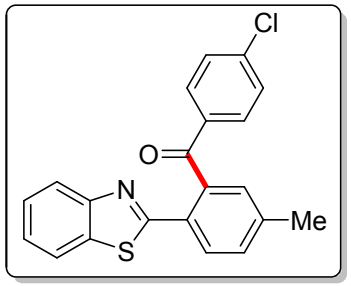
```
wkp1  s2pul

      SAMPLE              SPECIAL
date     Sep 1  2014  temp       not used
solvent       CDCl3   gain       not used
file            exp   spin       not used
   ACQUISITION        hst           0.008
sw           25125.6  pw90         18.600
at             1.199  alfa         20.000
np             60270        FLAGS
fb             13800  il                n
bs                32  in                n
d1             1.000  dp                y
nt              5000  hs               nn
ct               800       PROCESSING
   TRANSMITTER       lb             2.00
tn               C13  fn            65536
sfrq         100.554        DISPLAY
tof           1536.3  sp          -133.1
tpwr              61  wp         22451.0
pw             9.300  rfl         9284.4
    DECOUPLER        rfp         7764.9
dn                H1  rp           -71.1
dof                0  lp          -291.3
dm               yyy         PLOT
dmm                w  wc             250
dpwr              42  sc               0
dmf             8900  vs              23
                      th               3
                      nm  no  ph
```





(2-(Benzo[*d*]thiazol-2-yl)-5-methylphenyl)(4-chlorophenyl)methanone (2d): **^{1}H NMR ($CDCl_3$, 600 MHz)**

NK-ABENZ-15_1H

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Current Data Parameters
NAME      NK-ABENZ-15_1H
EXPNO                  1
PROCNO                 1

F2 - Acquisition Parameters
Date_           20140520
Time              14.41
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                  16
DS                   2
SWH           12019.230 Hz
FIDRES        0.366798 Hz
AQ            1.3631488 sec
RG                54.94
DW               41.600 usec
DE                6.50 usec
TE               299.1 K
D1            1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1         600.1737063 MHz
NUC1               1H
P1                12.00 usec
PLW1         21.00000000 W

F2 - Processing parameters
SI                16384
SF           600.1700181 MHz
WDW                EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
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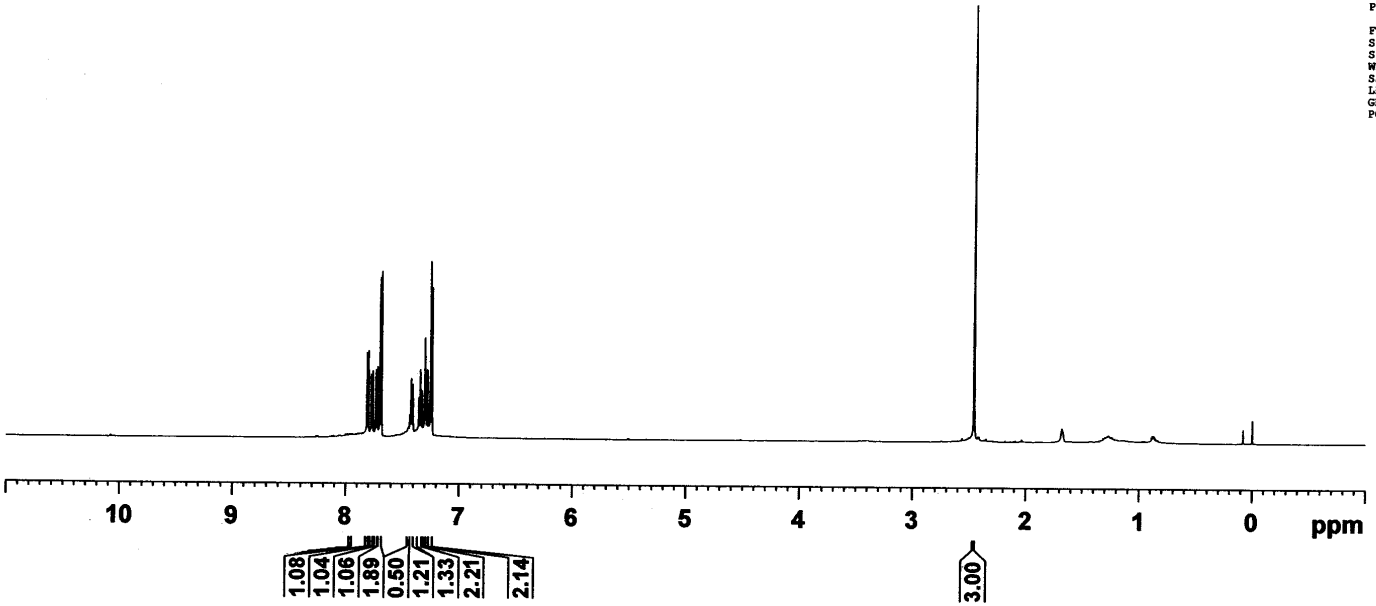
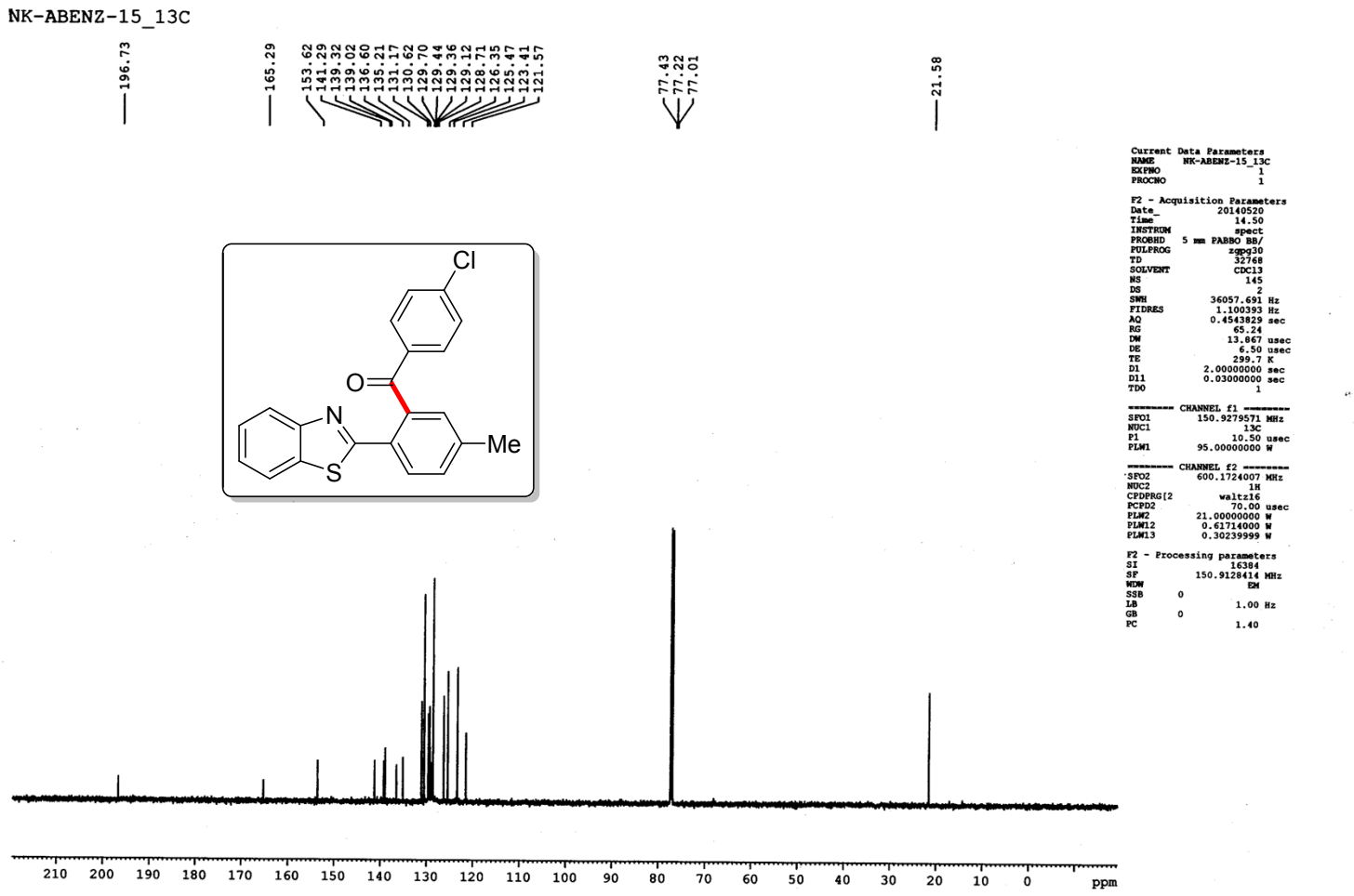
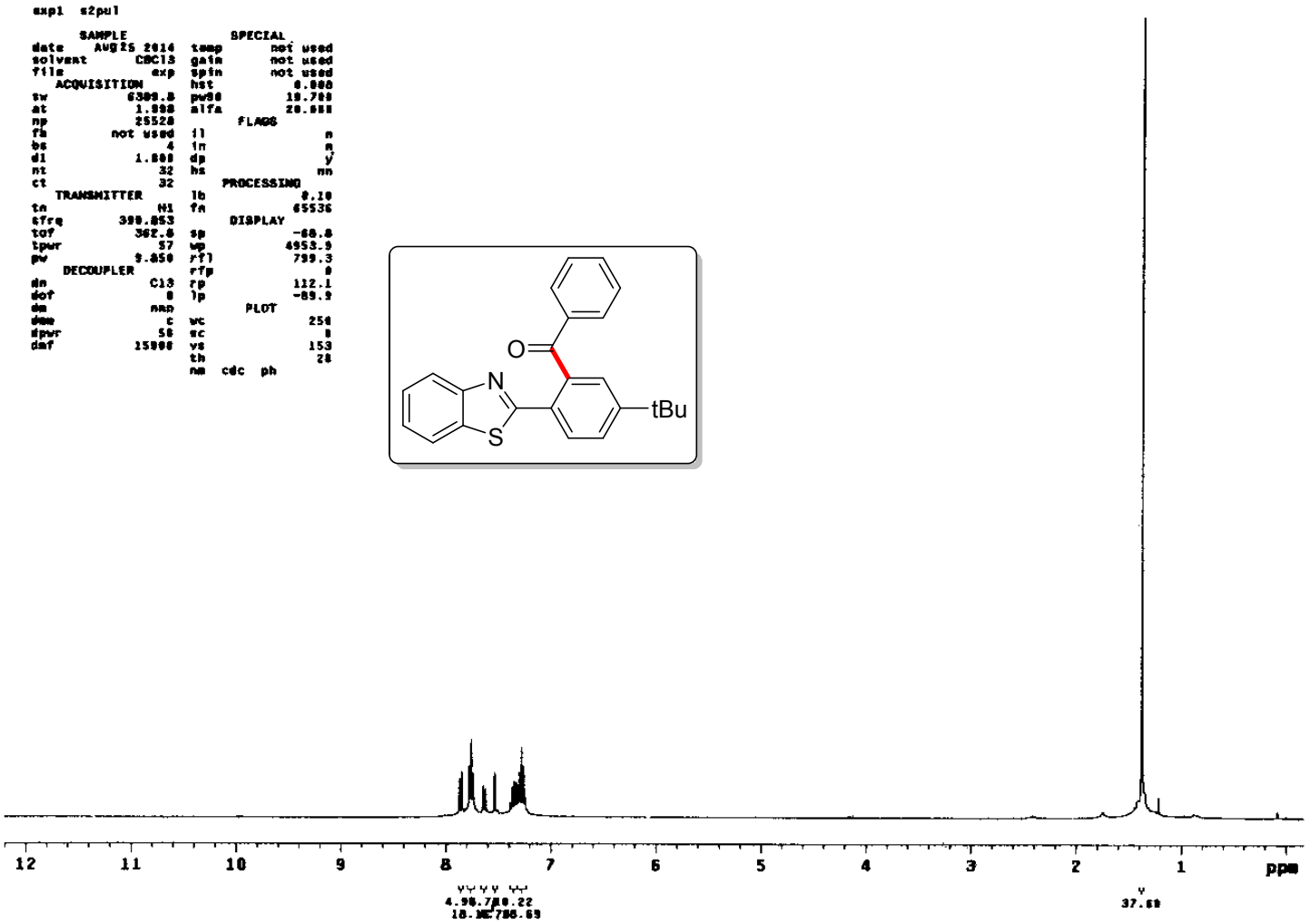


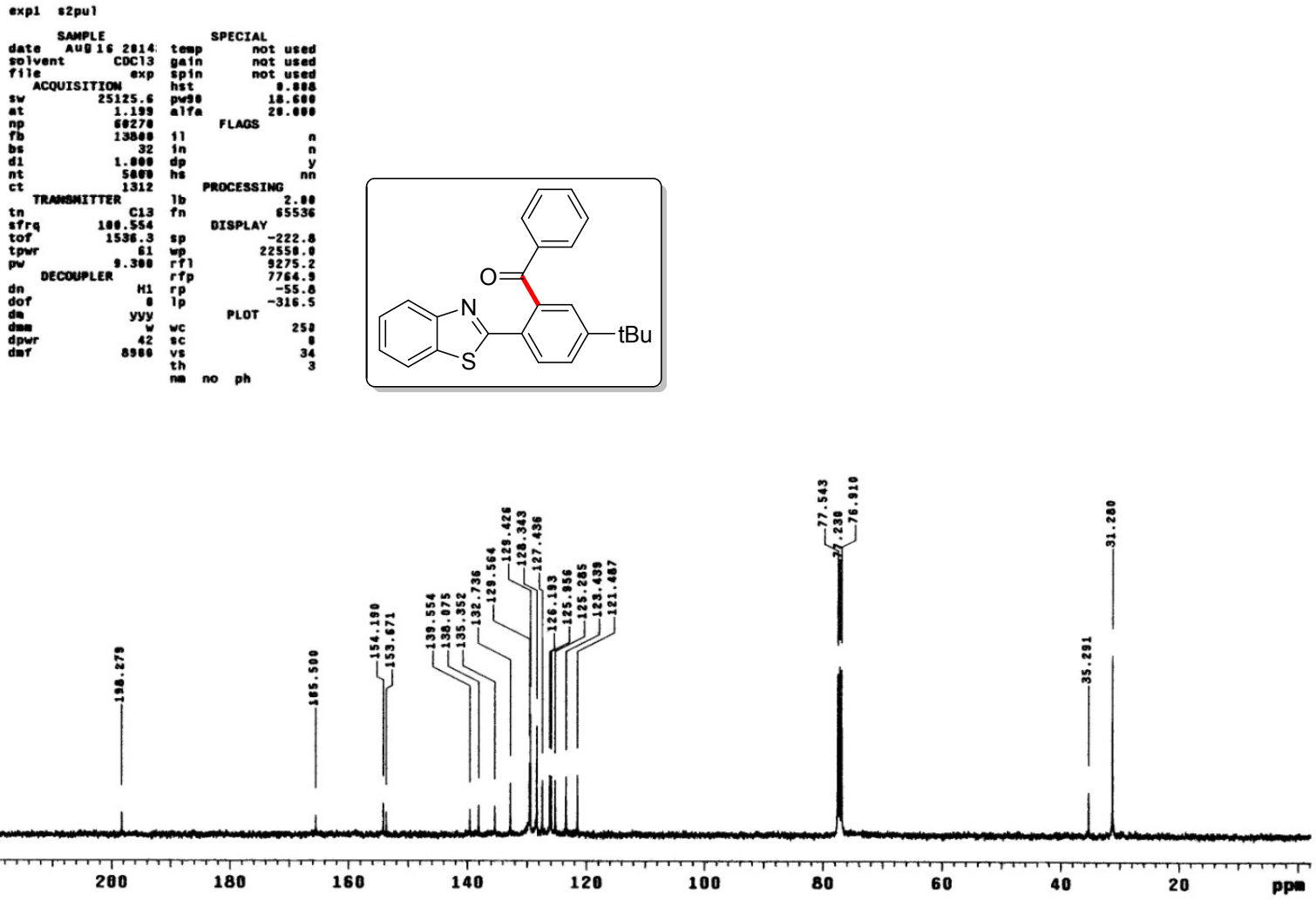
(2-(Benzo[*d*]thiazol-2-yl)-5-methylphenyl)(4-chlorophenyl)methanone (2d): ^{13}C NMR ($CDCl_3$, 150 MHz)



(2-(Benzo[*d*]thiazol-2-yl)-5-(*tert*-butyl)phenyl)(phenyl)methanone (3a): **^{1}H NMR ($CDCl_3$, 400 MHz)**

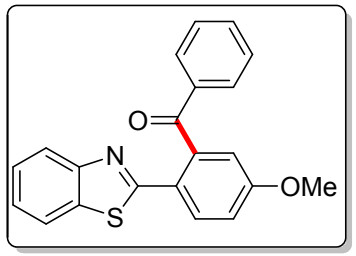


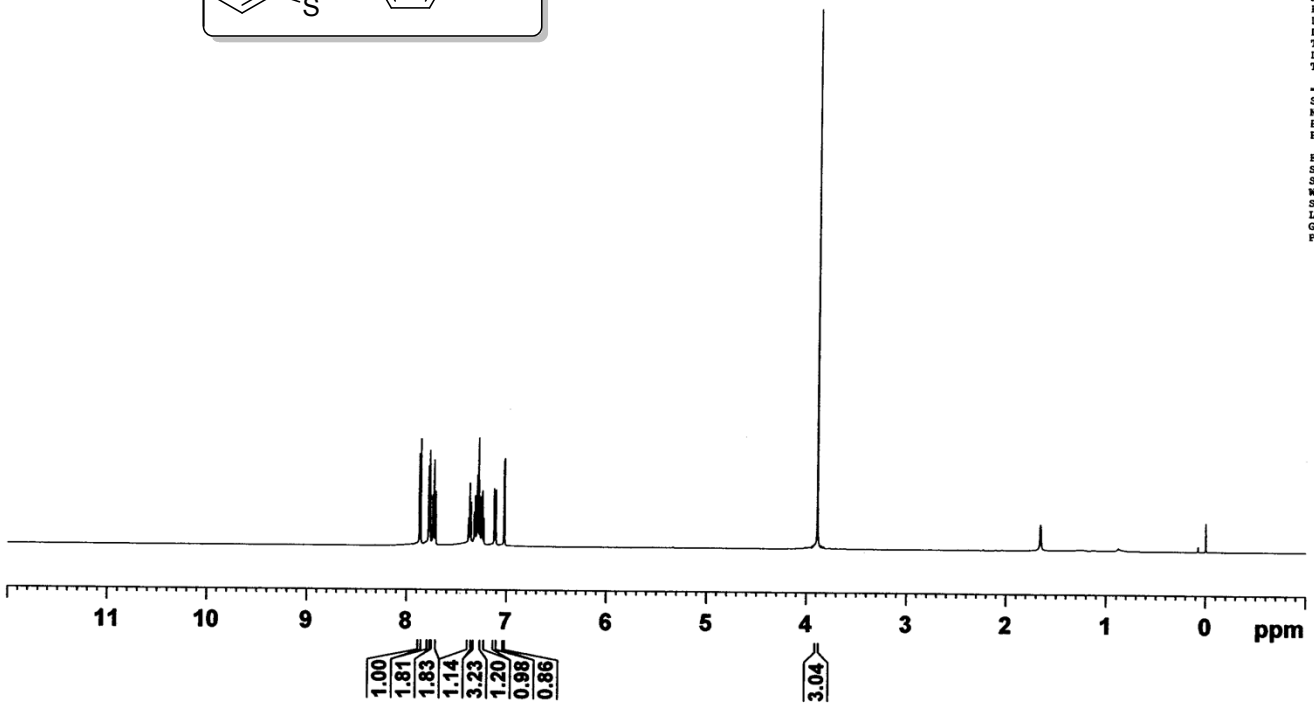
(2-(Benzo[*d*]thiazol-2-yl)-5-(*tert*-butyl)phenyl)(phenyl)methanone (3a): **^{13}C NMR ($CDCl_3$, 100 MHz)**



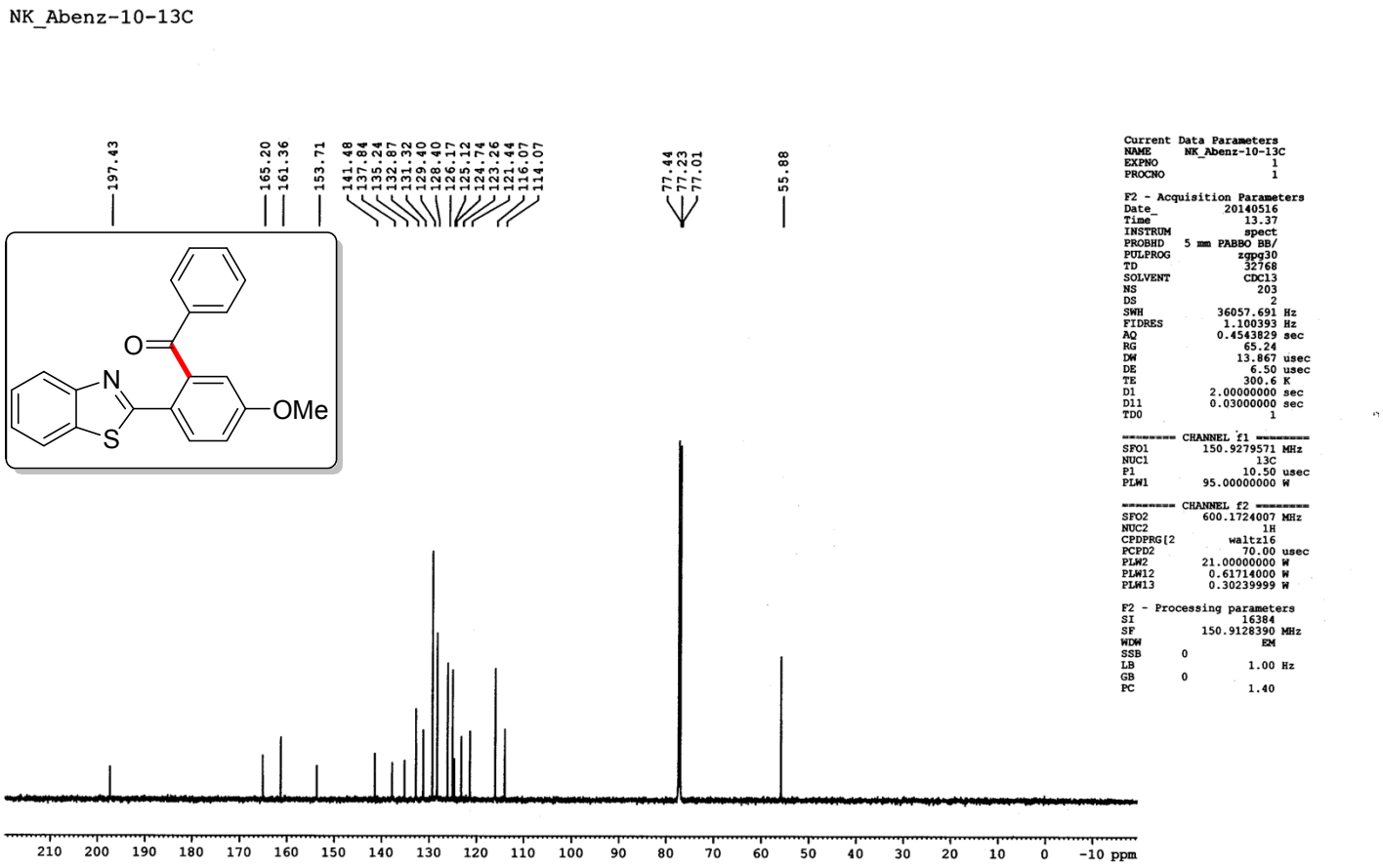
(2-(Benzo[*d*]thiazol-2-yl)-5-methoxyphenyl)(phenyl)methanone (4a): ^{1}H NMR ($CDCl_3$, 600 MHz)

NK_Abenz-10- 1H





(2-(Benzo[*d*]thiazol-2-yl)-5-methoxyphenyl)(phenyl)methanone (4a): ^{13}C NMR ($CDCl_3$, 150 MHz)

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Current Data Parameters
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PROCNO                    1

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Time                  13.37
INSTRUM               spect
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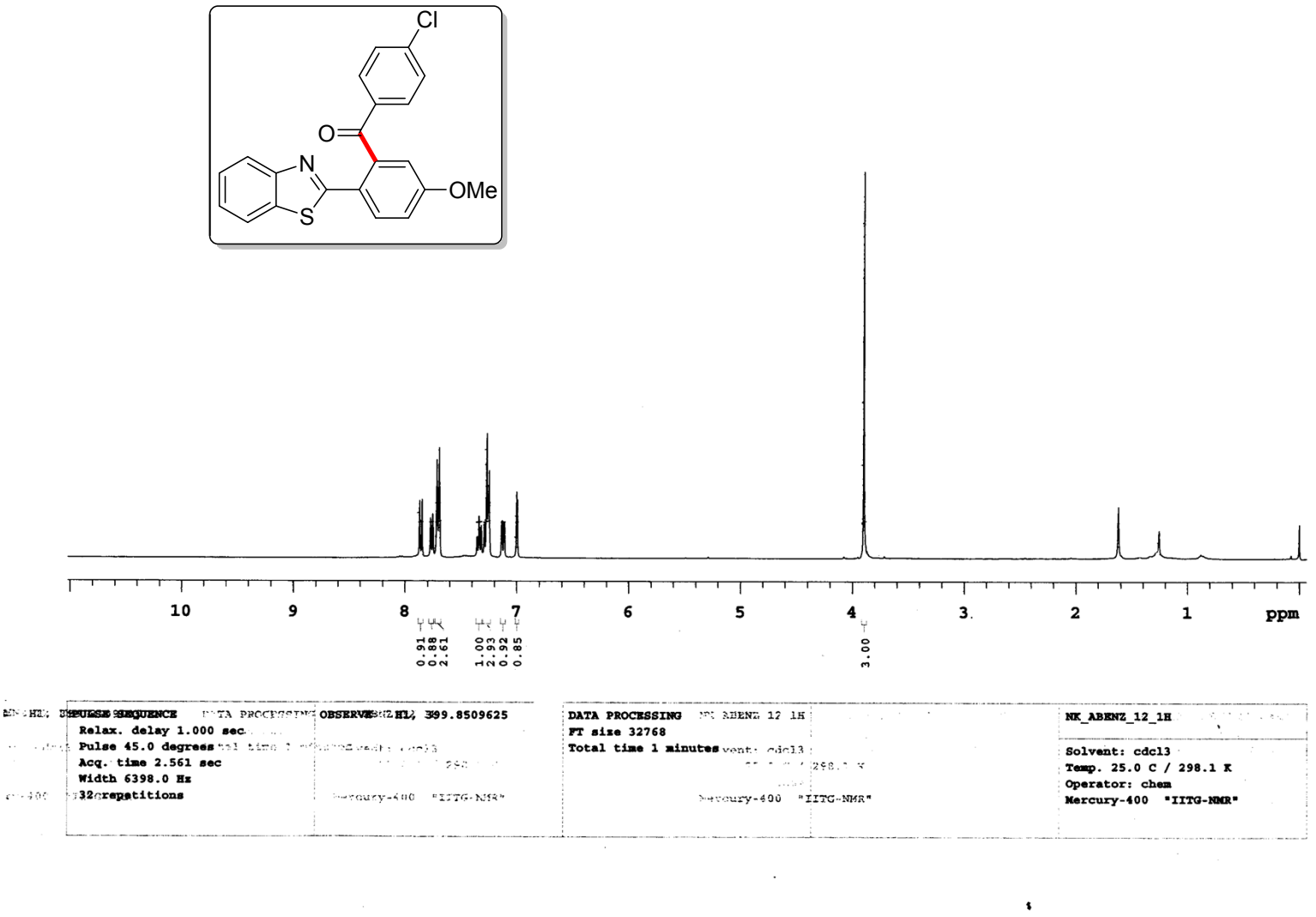
PULPROG             zgpg30
TD                   32768
SOLVENT              CDCl3
NS                     203
DS                       2
SWH              36057.691 Hz
FIDRES           1.100393 Hz
AQ               0.4543829 sec
RG                   65.24
DW                 13.867 usec
DE                   6.50 usec
TE                  300.6 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                      1

======== CHANNEL f1 ========
SFO1          150.9279571 MHz
NUC1                   13C
P1                   10.50 usec
PLW1          95.00000000 W

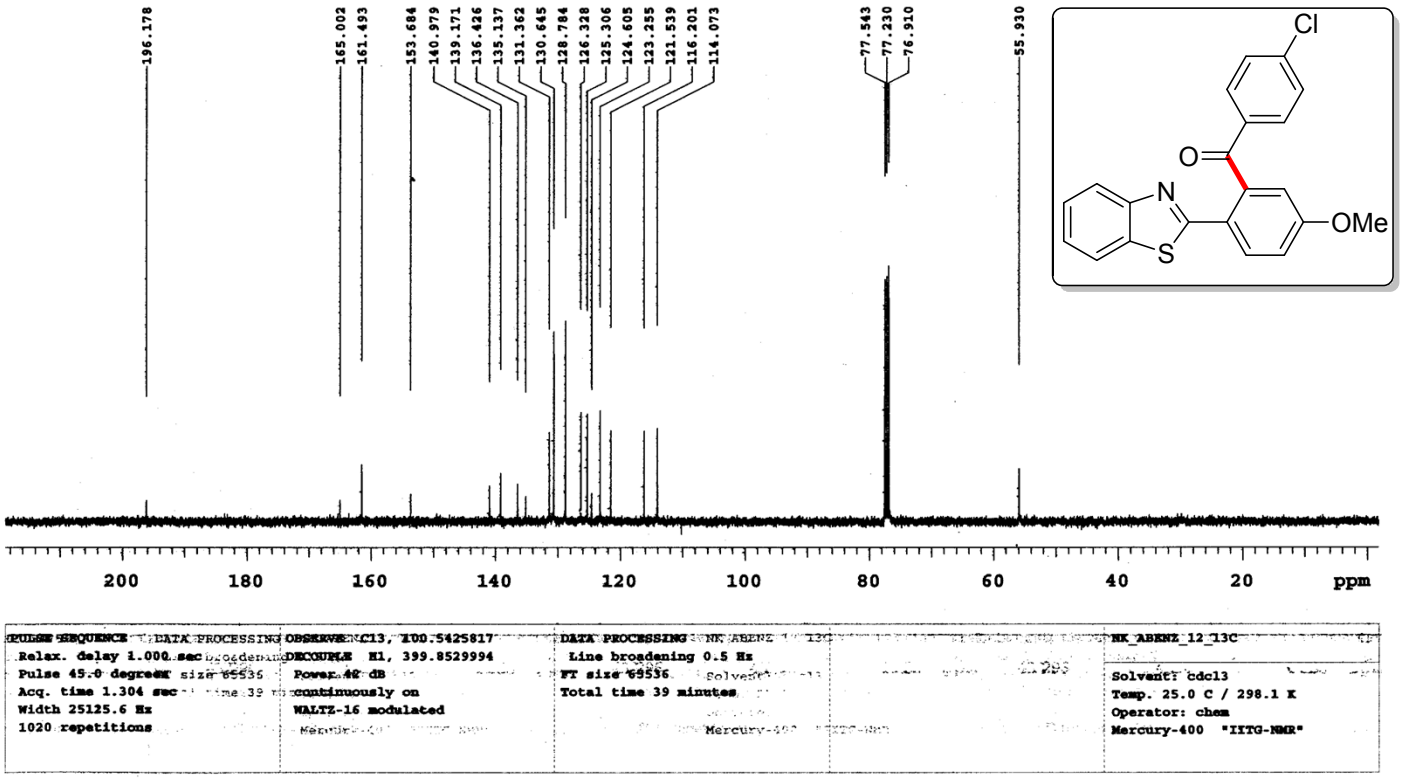
======== CHANNEL f2 ========
SFO2          600.1724007 MHz
NUC2                   1H
CPDPRG[2            waltz16
PCPD2                70.00 usec
PLW2          21.00000000 W
PLW12          0.61714000 W
PLW13          0.30239999 W

F2 - Processing parameters
SI                     16384
SF            150.9128390 MHz
WDW                       EM
SSB       0
LB                    1.00 Hz
GB        0
PC                    1.40
```

(2-(Benzo[*d*]thiazol-2-yl)-5-methoxyphenyl)(4-chlorophenyl)methanone (4d): **^{1}H NMR ($CDCl_3$, 400 MHz)**

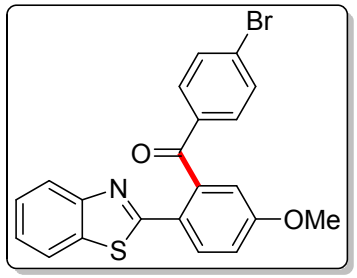


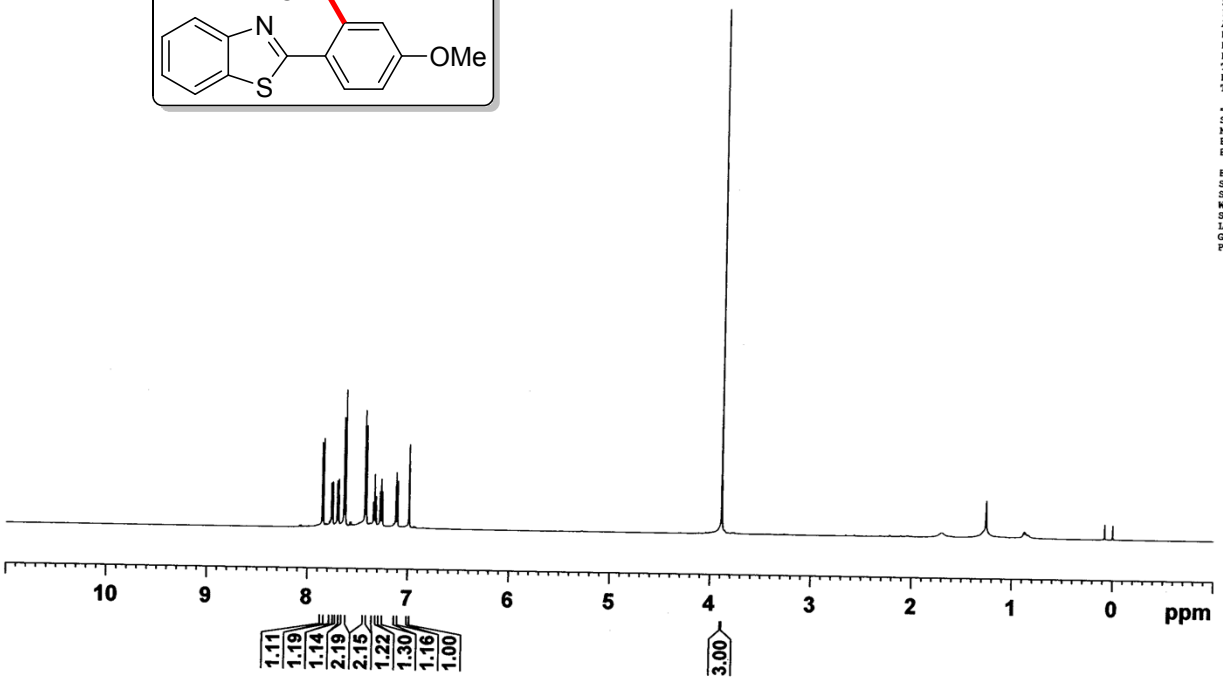
(2-(Benzo[*d*]thiazol-2-yl)-5-methoxyphenyl)(4-chlorophenyl)methanone (4d): ^{13}C NMR ($CDCl_3$, 100 MHz)



(2-(Benzo[*d*]thiazol-2-yl)-5-methoxyphenyl)(4-bromophenyl)methanone (4e): **^{1}H NMR ($CDCl_3$, 600 MHz)**

NK-Abenz-16-1H



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Current Data Parameters
NAME       NK-Abenz-16-1H
EXPNO                   1
PROCNO                  1

F2 - Acquisition Parameters
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Time              14.20
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PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                  16
DS                   2
SWH           12019.230 Hz
FIDRES        0.366798 Hz
AQ            1.3631488 sec
RG                65.24
DW               41.600 usec
DE                6.50 usec
TE              299.2 K
D1            1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        600.1737063 MHz
NUC1              1H
P1               12.00 usec
PLW1        21.00000000 W

F2 - Processing parameters
SI               16384
SF          600.1700174 MHz
WDW                EM
SSB       0
LB               0.30 Hz
GB        0
PC               1.00
```
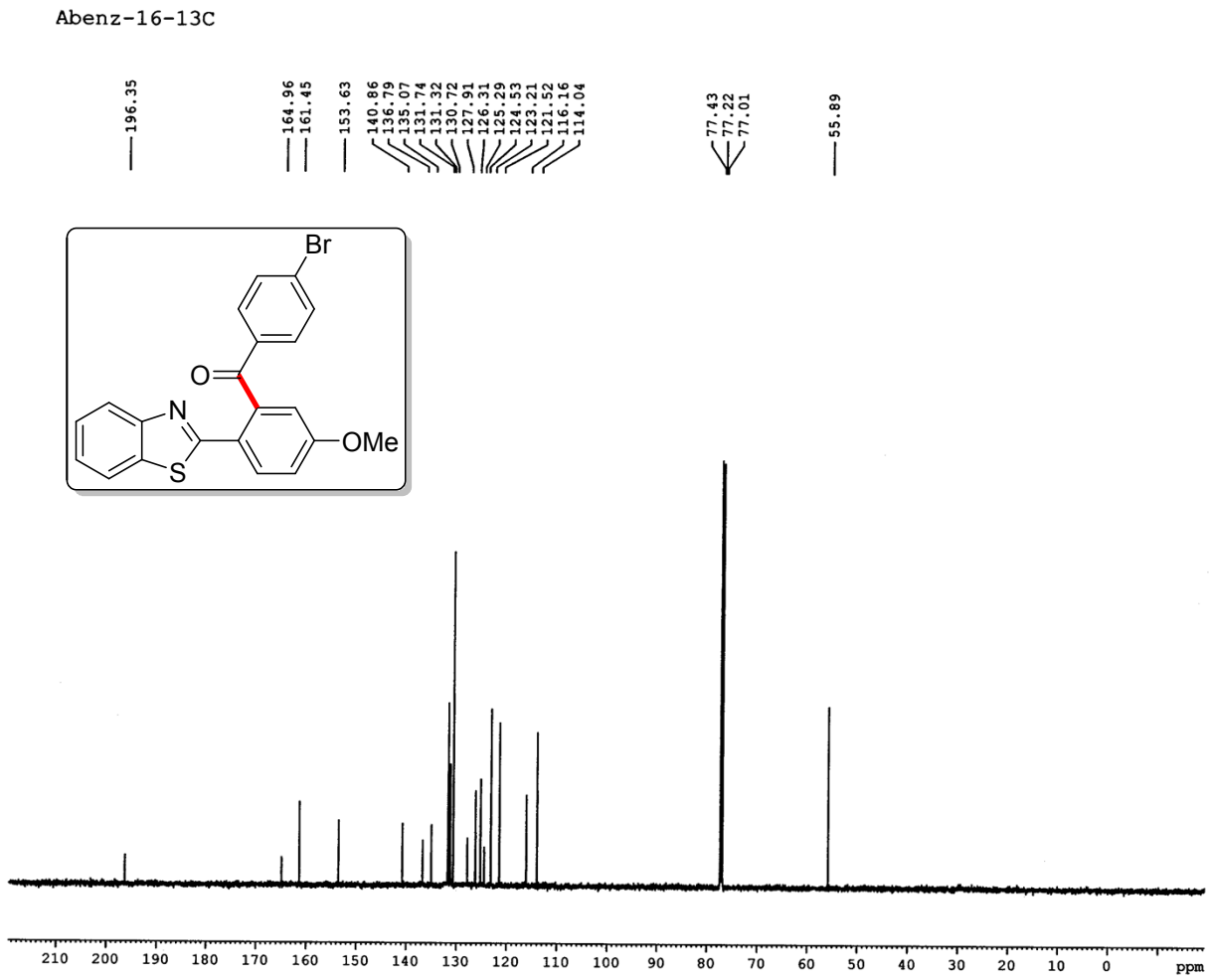

(2-(Benzo[*d*]thiazol-2-yl)-5-methoxyphenyl)(4-bromophenyl)methanone (4e): **^{13}C NMR ($CDCl_3$, 150 MHz)**

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Current Data Parameters
NAME      NK-Abenz-16-13C
EXPNO                   1
PROCNO                  1

F2 - Acquisition Parameters
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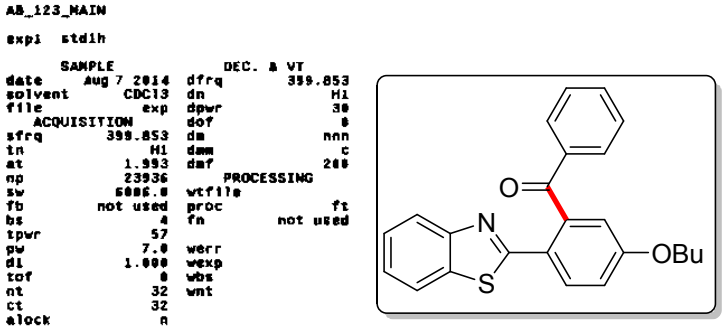
Time              14.57
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD              32768
SOLVENT           CDCl3
NS                  221
DS                    2
SWH           36057.691 Hz
FIDRES         1.100393 Hz
AQ            0.4543829 sec
RG                65.24
DW               13.867 usec
DE                6.50 usec
TE               300.4 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                   1

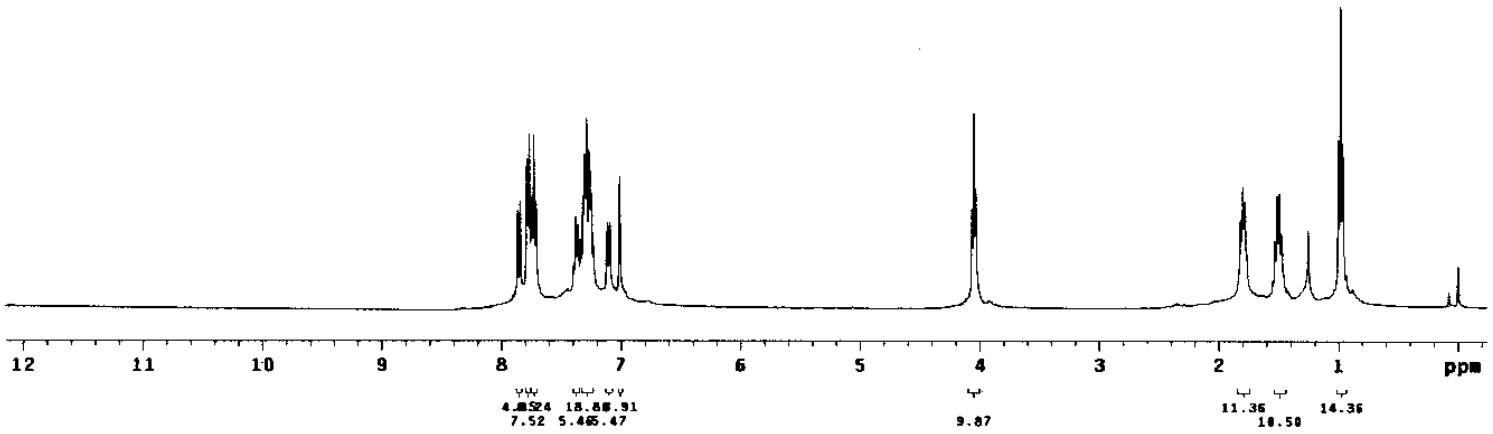
======== CHANNEL f1 ========
SFO1        150.9279571 MHz
NUC1              13C
P1              10.50 usec
PLW1        95.00000000 W

======== CHANNEL f2 ========
SFO2        600.1724007 MHz
NUC2              1H
CPDPRG[2        waltz16
PCPD2             70.00 usec
PLW2        21.00000000 W
PLW12        0.61714000 W
PLW13        0.30239999 W

F2 - Processing parameters
SI                16384
SF          150.9128414 MHz
WDW                EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.40
```

(2-(Benzo[*d*]thiazol-2-yl)-5-butoxyphenyl)(phenyl)methanone (5a): ^{1}H NMR ($CDCl_3$, 400 MHz)

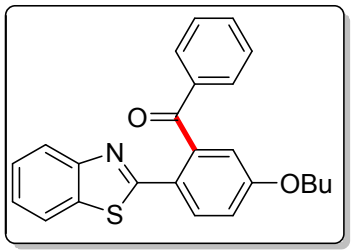


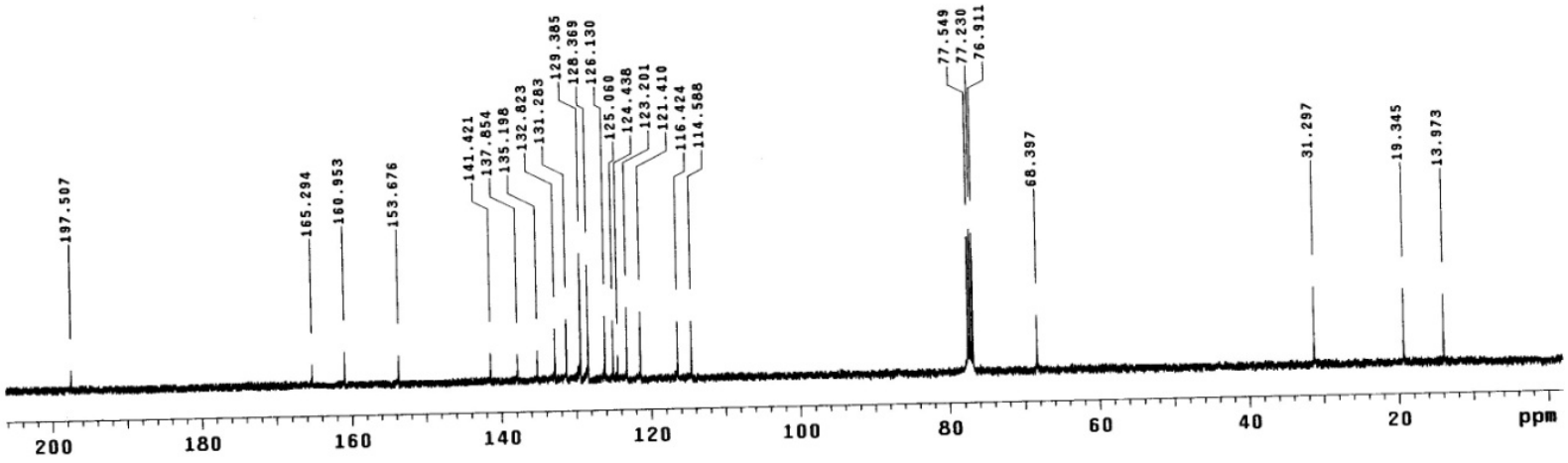


(2-(Benzo[*d*]thiazol-2-yl)-5-butoxyphenyl)(phenyl)methanone (5a): **^{13}C NMR ($CDCl_3$, 100 MHz)**

```
expl  std13c

      SAMPLE                    SPECIAL
date          2014   temp          not used
solvent       CDCl3  gain          not used
file           exp   spin          not used
   ACQUISITION        hst             0.008
sw          25000.0   pw90           18.600
at              1.199 alfa           20.000
np              59968        FLAGS
fb              13800  il                 n
bs                 32  in                 n
d1                  0  dp                 y
nt               5000  hs                nn
ct               1248       PROCESSING
   TRANSMITTER          lb              1.00
tn                C13   fn          not used
sfrq          100.552        DISPLAY
tof                0   sp            -191.3
tpwr              61   wp           20925.8
pw             8.667   rfl          10747.9
    DECOUPLER          rfp           7764.9
dn                H1   rp             -66.3
dof                0   lp            -270.0
dm               yyy        PLOT
dmm                w   wc                250
dpwr              42   sc                  0
dmf             8900   vs                 23
                       th                  3
                       nm  no  ph
```

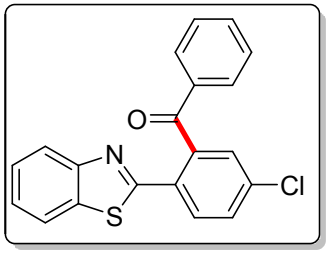


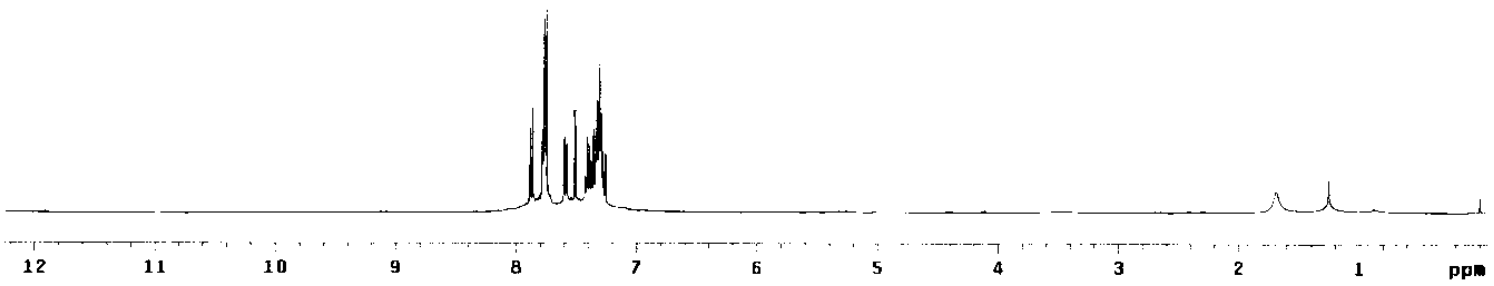


(2-(Benzo[*d*]thiazol-2-yl)-5-chlorophenyl)(phenyl)methanone (6a): **^{1}H NMR ($CDCl_3$, 400 MHz)**

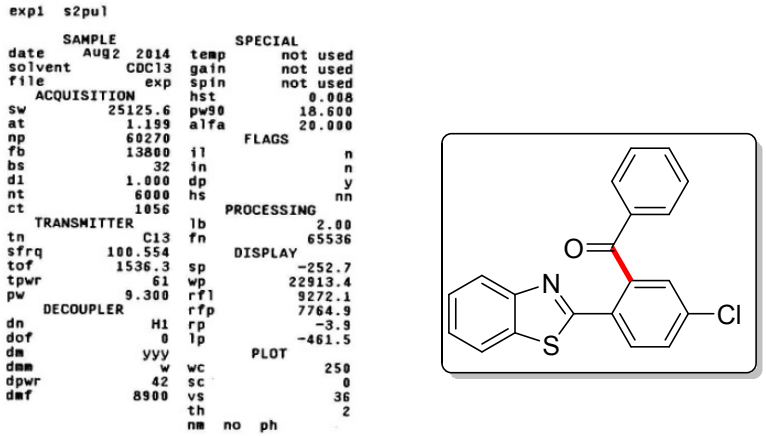
```
exp1  s2pul

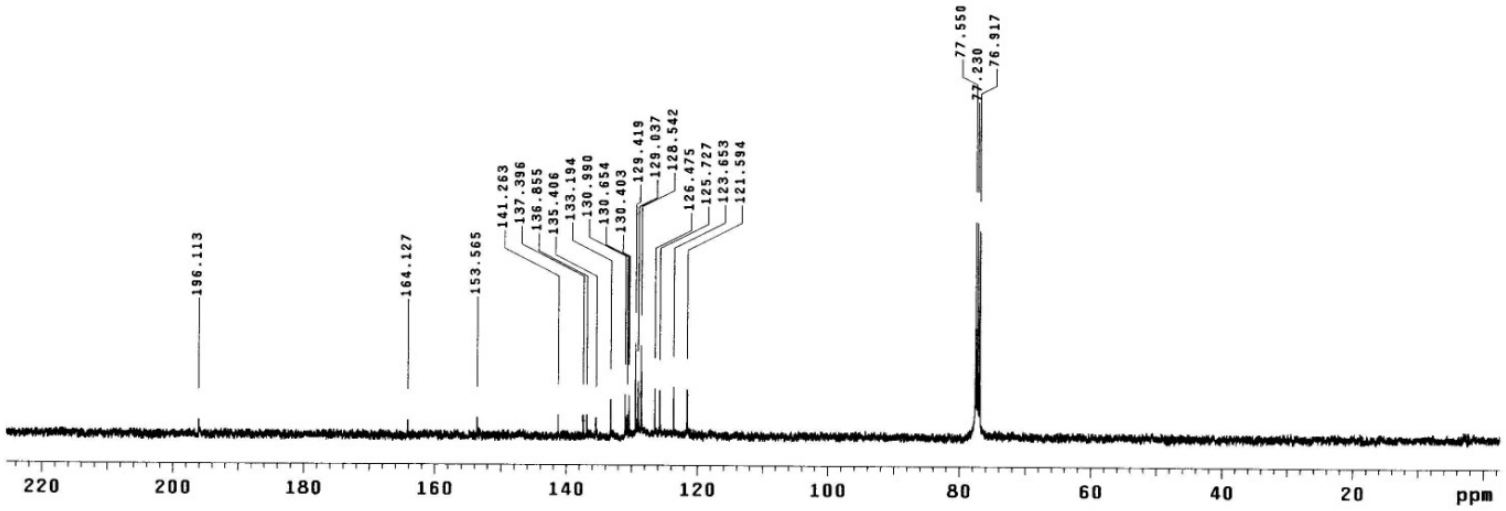
      SAMPLE                SPECIAL
date      Aug1  2014  temp       not used
solvent        CDCl3  gain       not used
file            exp   spin       not used
   ACQUISITION          hst          9.008
sw             6389.8  pw90        19.700
at             1.998   alfa        20.000
np             25528       FLAGS
fb         not used    il             n
bs                 4    in             n
ni             1.000    dp             y
nt                32    hs            nn
ct                32       PROCESSING
   TRANSMITTER         lb          0.10
tn                H1    fn         65536
sfrq         399.853       DISPLAY
tof            362.8    sp         -39.4
tpwr              57    wp        4937.2
pw             9.850    rfl        795.0
    DECOUPLER           rfp            0
dn               CL3    rp         110.6
dof                0    lp         -75.6
dm               nnn        PLOT
dmm                c    wc           250
dpwr              50    sc             0
dmf            15900    vs            34
                        th            13
                        nm  cdc  ph
```



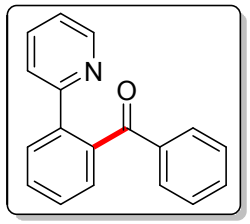


(2-(Benzo[*d*]thiazol-2-yl)-5-chlorophenyl)(phenyl)methanone (6a): **^{13}C NMR ($CDCl_3$, 100 MHz)**





Phenyl(2-(pyridin-2-yl)phenyl)methanone (7a): ^{1}H NMR ($CDCl_3$, 600 MHz)

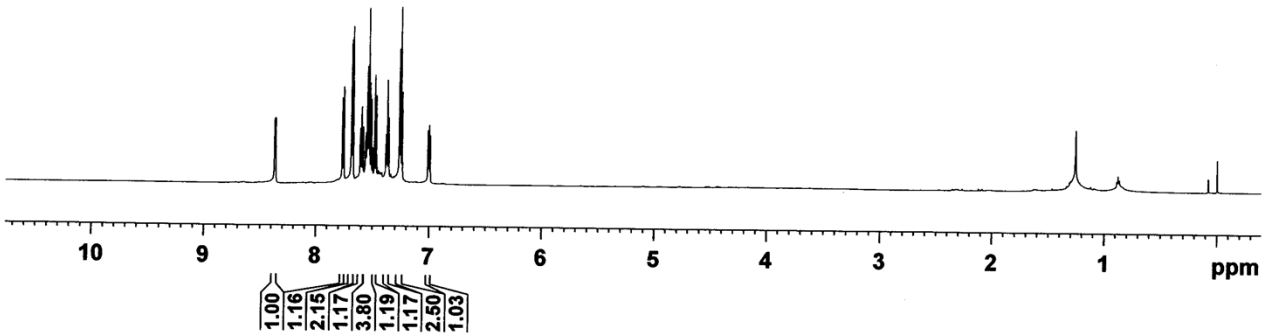



```
Current Data Parameters
NAME      NK-2PPA-1RE-1H
EXPNO                  1
PROCNO                 1

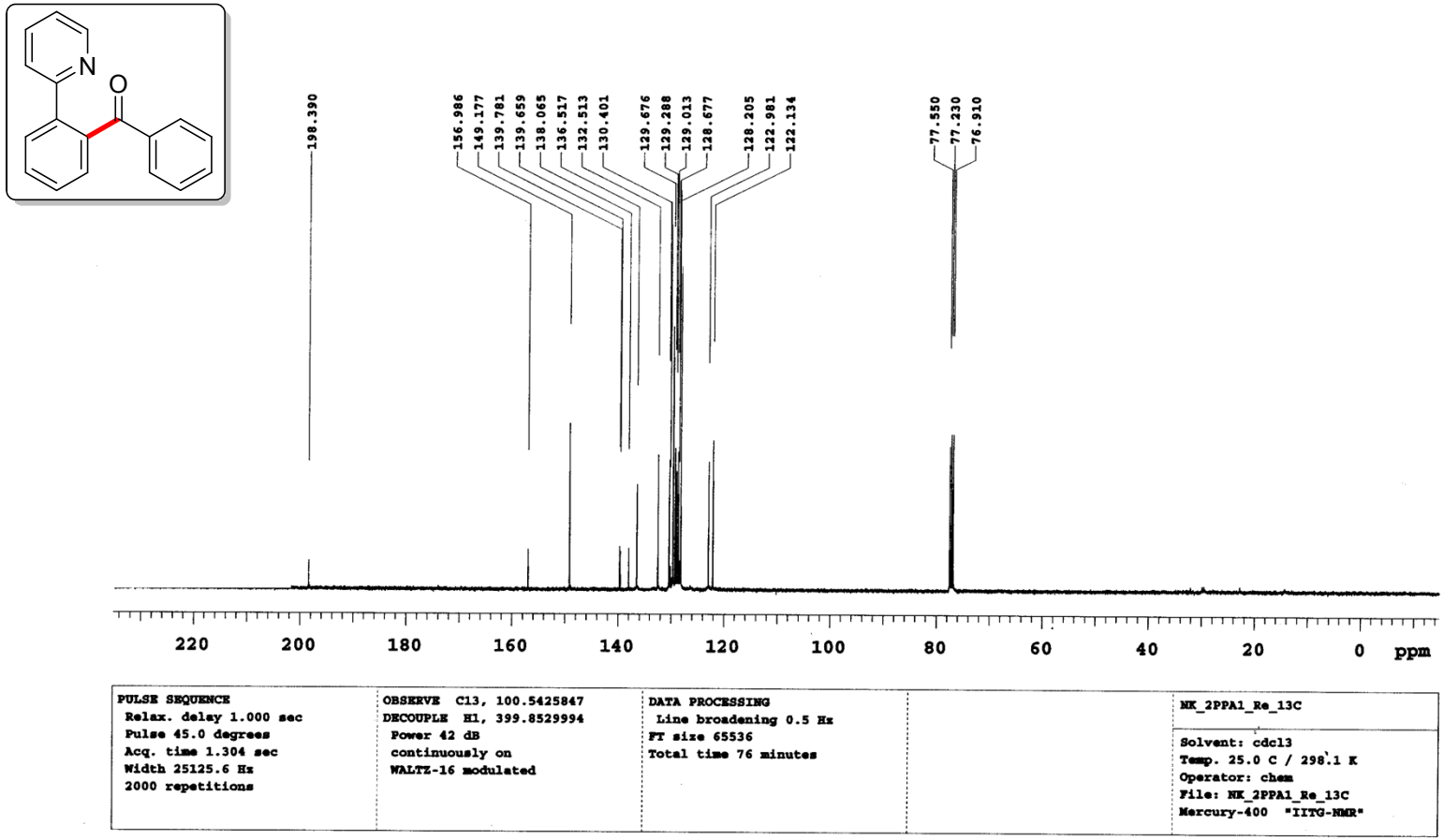
F2 - Acquisition Parameters
Date_           20140422
Time              11.14
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                  16
DS                   2
SWH          12019.230 Hz
FIDRES        0.366798 Hz
AQ            1.3631488 sec
RG                49.39
DW              41.600 usec
DE               6.50 usec
TE              303.5 K
D1          1.00000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        600.1737063 MHz
NUC1                1H
P1                12.00 usec
PLW1        21.00000000 W

F2 - Processing parameters
SI                16384
SF          600.1700167 MHz
WDW                  EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
```

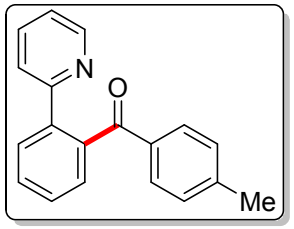


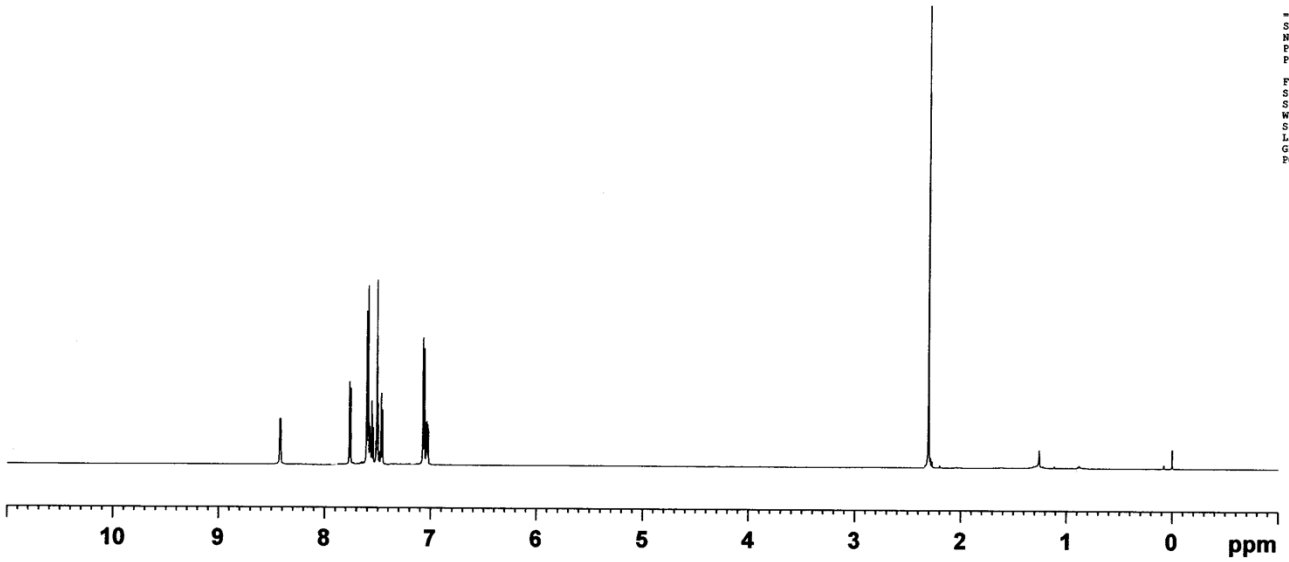
Phenyl(2-(pyridin-2-yl)phenyl)methanone (7a): ^{13}C NMR ($CDCl_3$, 100 MHz)



(2-(Pyridin-2-yl)phenyl)(p-tolyl)methanone (7b): **^{1}H NMR ($CDCl_3$, 600 MHz)**

NK-2PPA-38-1H





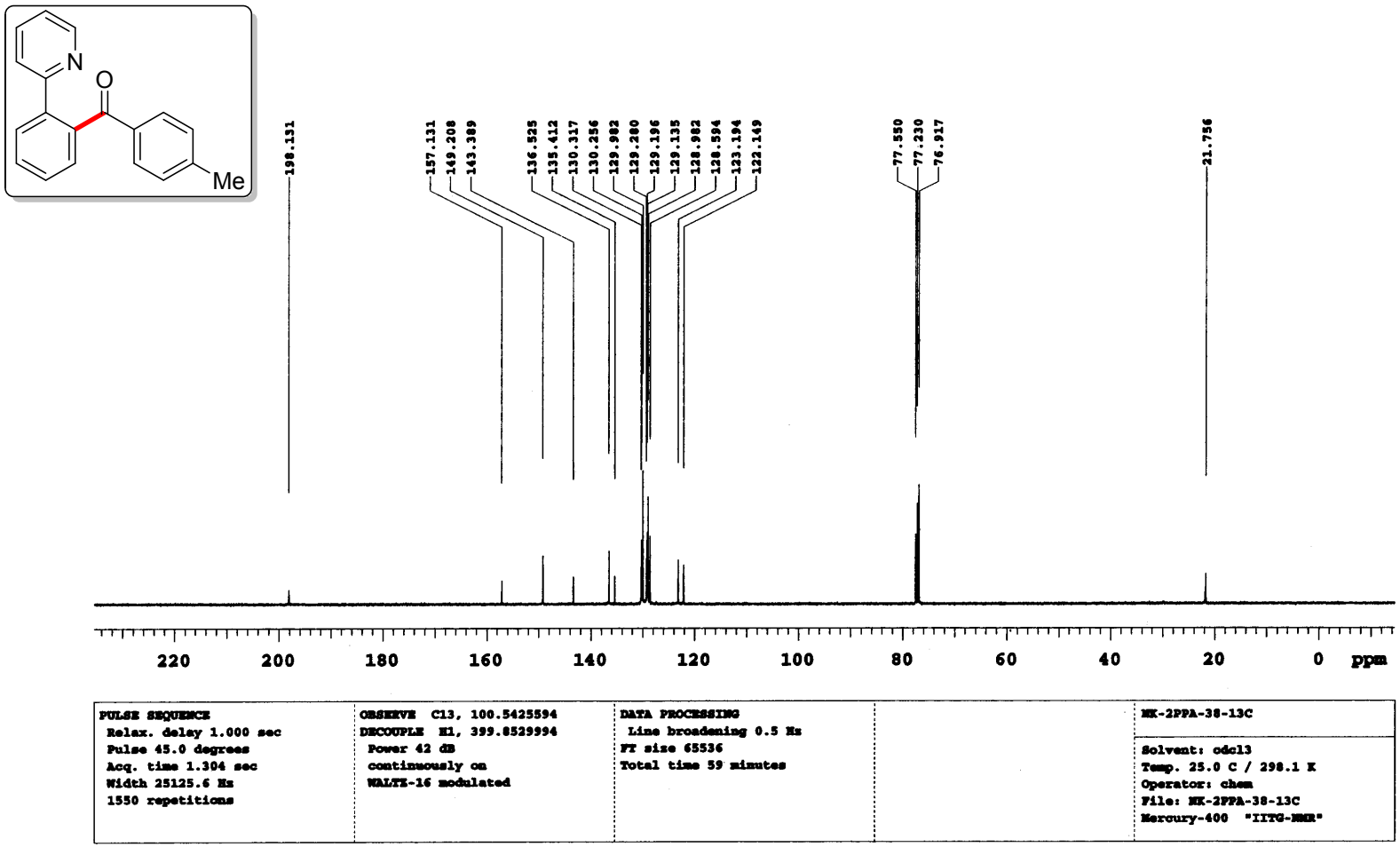

```
Current Data Parameters
NAME       NK-2PPA-38-1H
EXPNO                 1
PROCNO                1

F2 - Acquisition Parameters
Date_          20140829
Time              10.46
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                  16
DS                   2
SWH           12019.230 Hz
FIDRES        0.366798 Hz
AQ            1.3631488 sec
RG                49.39
DW               41.600 usec
DE                6.50 usec
TE               298.6 K
D1            1.00000000 sec
TD0                   1

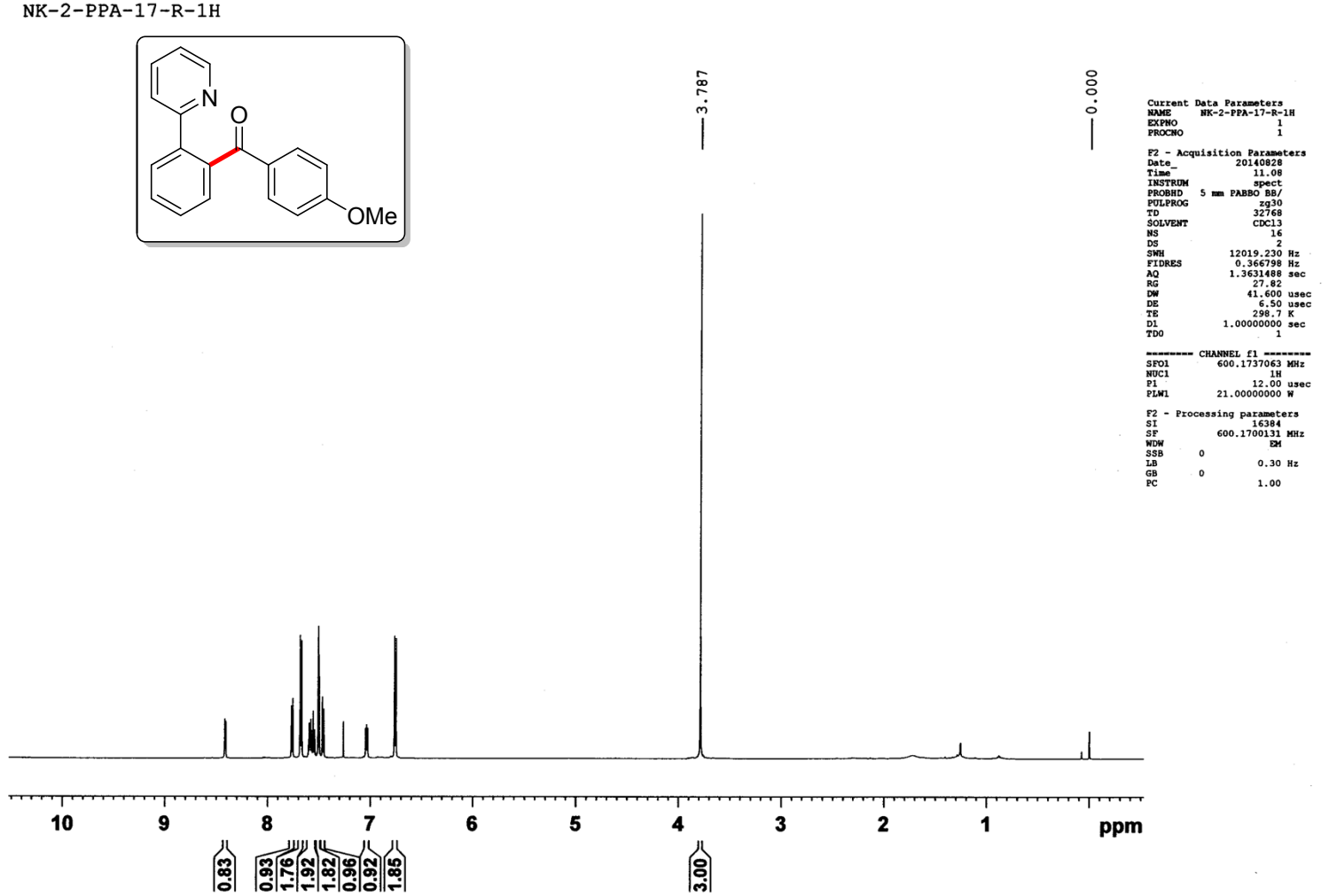
======== CHANNEL f1 ========
SFO1         600.1737063 MHz
NUC1               1H
P1                12.00 usec
PLW1         21.00000000 W

F2 - Processing parameters
SI                16384
SF           600.1700160 MHz
WDW                EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
```

(2-(Pyridin-2-yl)phenyl)(p-tolyl)methanone (7b): ^{13}C NMR ($CDCl_3$, 100 MHz)



(4-Methoxyphenyl)(2-(pyridin-2-yl)phenyl)methanone (7c): **^{1}H NMR ($CDCl_3$, 600 MHz)**



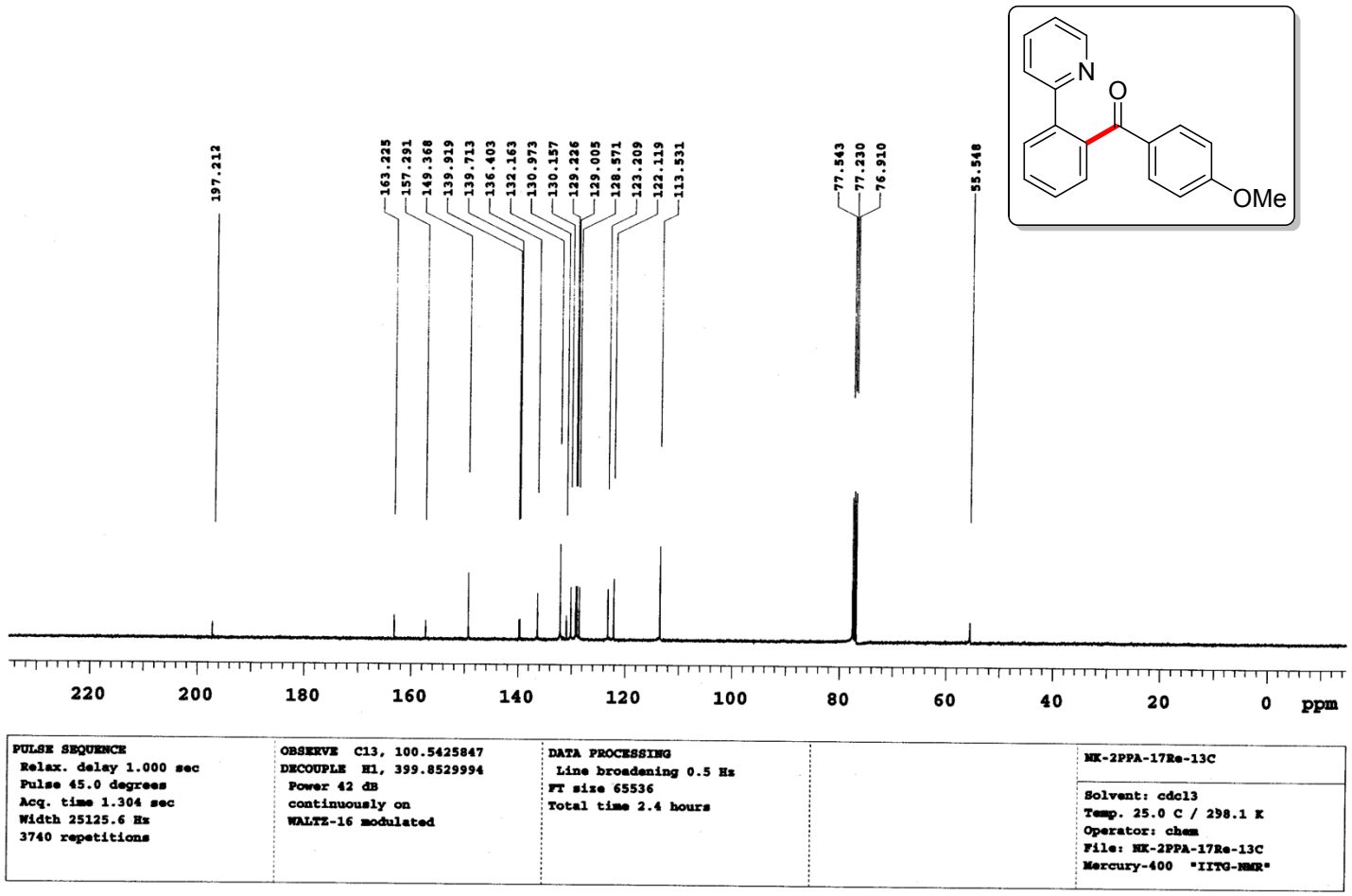

```
Current Data Parameters
NAME      NK-2-PPA-17-R-1H
EXPNO                    1
PROCNO                   1

F2 - Acquisition Parameters
Date_              20140828
Time                  11.08
INSTRUM               spect
PROBHD   5 mm PABBO BB/
PULPROG               zg30
TD                   32768
SOLVENT              CDCl3
NS                      16
DS                       2
SWH               12019.230 Hz
FIDRES            0.366798 Hz
AQ                1.3631488 sec
RG                    27.82
DW                   41.600 usec
DE                    6.50 usec
TE                   298.7 K
D1                1.00000000 sec
TD0                      1

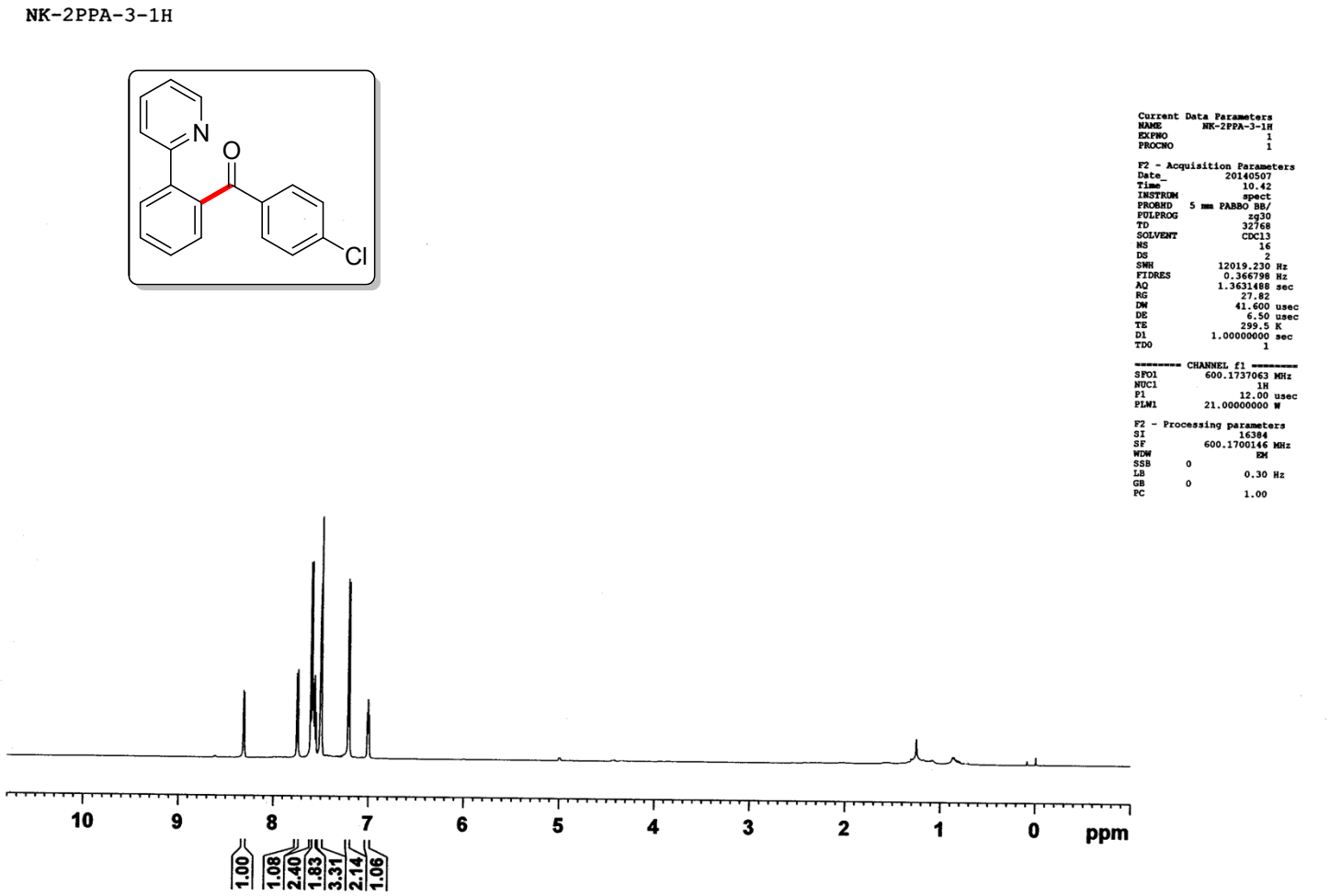
======== CHANNEL f1 ========
SFO1           600.1737063 MHz
NUC1                     1H
P1                   12.00 usec
PLW1          21.00000000 W

F2 - Processing parameters
SI                   16384
SF             600.1700131 MHz
WDW                     EM
SSB      0
LB                    0.30 Hz
GB       0
PC                    1.00
```

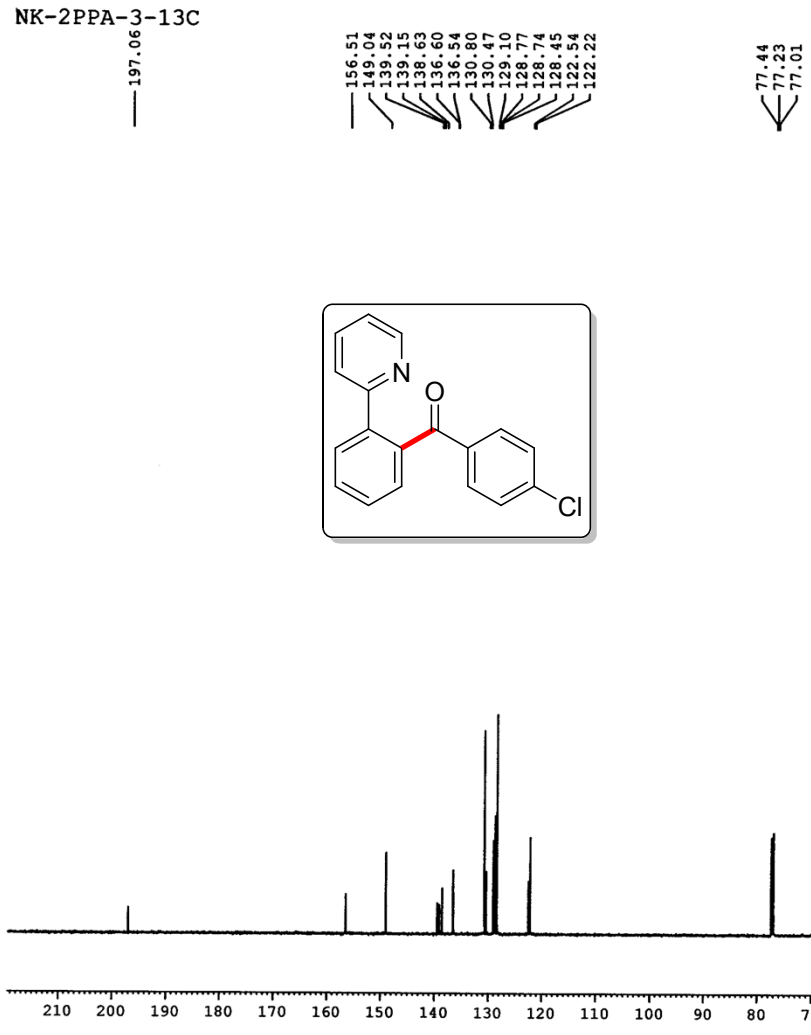
(4-Methoxyphenyl)(2-(pyridin-2-yl)phenyl)methanone (7c): ^{13}C NMR ($CDCl_3$, 100 MHz)



(4-Chlorophenyl)(2-(pyridin-2-yl)phenyl)methanone (7d): **^{1}H NMR ($CDCl_3$, 600 MHz)**



(4-Chlorophenyl)(2-(pyridin-2-yl)phenyl)methanone (7d): **^{13}C NMR ($CDCl_3$, 150 MHz)**




```
Current Data Parameters
NAME       NK-2PPA-3-13C
EXPNO                  1
PROCNO                 1

F2 - Acquisition Parameters
Date_           20140507
Time              10.49
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD                32768
SOLVENT           CDCl3
NS                   29
DS                    2
SWH           36057.691 Hz
FIDRES         1.100393 Hz
AQ            0.4543829 sec
RG                65.24
DW               13.867 usec
DE                6.50 usec
TE                300.1 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                   1

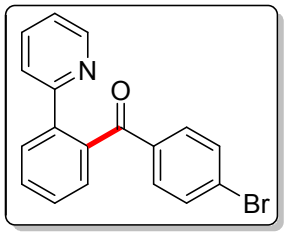
======== CHANNEL f1 ========
SFO1        150.9279571 MHz
NUC1                13C
P1                10.50 usec
PLW1        95.00000000 W

======== CHANNEL f2 ========
SFO2        600.1724007 MHz
NUC2                1H
CPDPRG[2         waltz16
PCPD2             70.00 usec
PLW2        21.00000000 W
PLW12        0.61714000 W
PLW13        0.30239999 W

F2 - Processing parameters
SI                 16384
SF          150.9128522 MHz
WDW                   EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 1.40
```

(4-Bromophenyl)(2-(pyridin-2-yl)phenyl)methanone (7e): **^{1}H NMR ($CDCl_3$, 600 MHz)**

NK-2PPA-13_1H

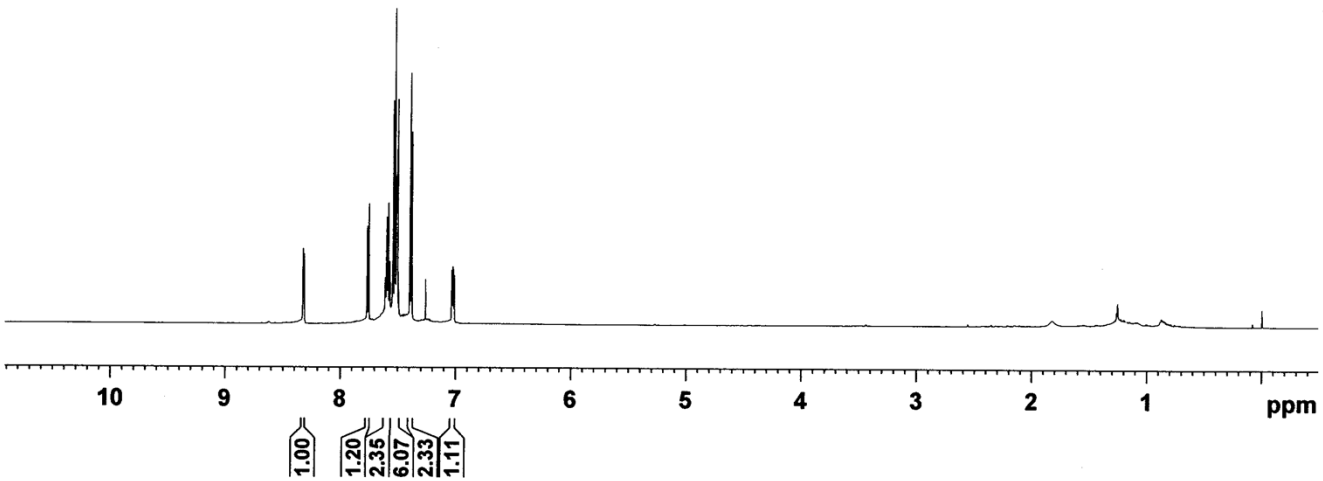



```
Current Data Parameters
NAME        NK-2PPA-13_1H
EXPNO                   1
PROCNO                  1

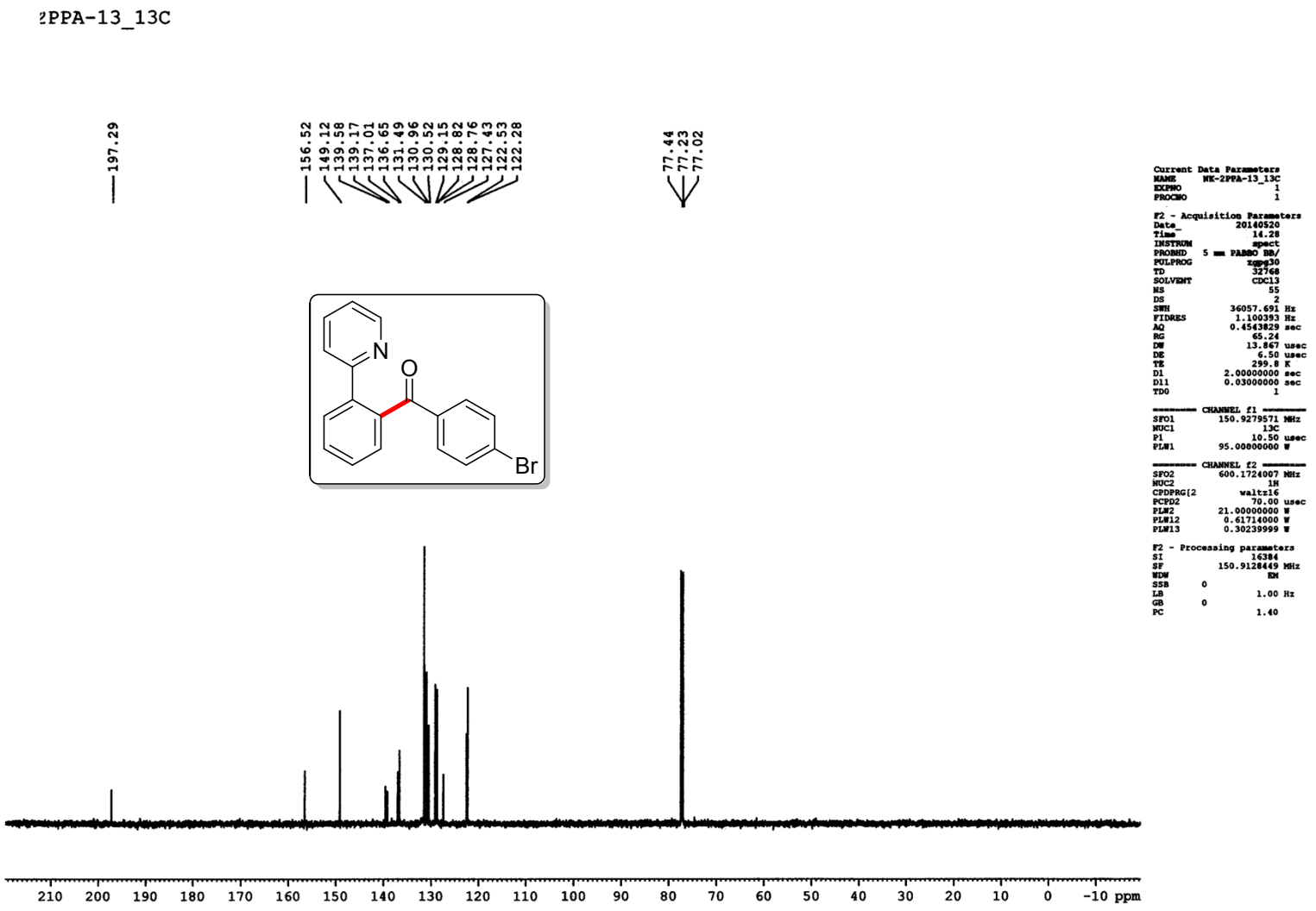
F2 - Acquisition Parameters
Date_            20140520
Time                14.22
INSTRUM             spect
PROBHD   5 mm PABBO BB/
PULPROG             zg30
TD                 32768
SOLVENT             CDCl3
NS                     16
DS                      2
SWH             12019.230 Hz
FIDRES          0.366798 Hz
AQ              1.3631488 sec
RG                  27.82
DW                 41.600 usec
DE                  6.50 usec
TE                 299.1 K
D1              1.00000000 sec
TD0                     1

======== CHANNEL f1 ========
SFO1          600.1737063 MHz
NUC1                   1H
P1                  12.00 usec
PLW1          21.00000000 W

F2 - Processing parameters
SI                  16384
SF            600.1700148 MHz
WDW                    EM
SSB       0
LB                  0.30 Hz
GB        0
PC                  1.00
```



(4-Bromophenyl)(2-(pyridin-2-yl)phenyl)methanone (7e): ^{13}C NMR ($CDCl_3$, 150 MHz)




```
Current Data Parameters
NAME          NK-2PPA-13_13C
EXPNO                      1
PROCNO                     1

F2 - Acquisition Parameters
Date_               20140520
Time                   14.28
INSTRUM                spect
PROBHD   5 mm PABBO BB/
PULPROG             zgpg30
TD                     32768
SOLVENT                CDCl3
NS                        55
DS                         2
SWH                36057.691 Hz
FIDRES              1.100393 Hz
AQ                  0.4543829 sec
RG                      65.24
DW                     13.867 usec
DE                      6.50 usec
TE                     299.8 K
D1                  2.00000000 sec
D11                 0.03000000 sec
TD0                        1

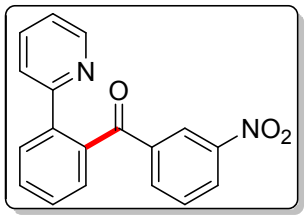
========== CHANNEL f1 ==========
SFO1             150.9279571 MHz
NUC1                       13C
P1                       10.50 usec
PLW1             95.00000000 W

========== CHANNEL f2 ==========
SFO2             600.1724007 MHz
NUC2                       1H
CPDPRG[2                waltz16
PCPD2                    70.00 usec
PLW2             21.00000000 W
PLW12             0.61714000 W
PLW13             0.30239999 W

F2 - Processing parameters
SI                         16384
SF               150.9128449 MHz
WDW                           EM
SSB          0
LB                        1.00 Hz
GB           0
PC                        1.40
```

(3-Nitrophenyl)(2-(pyridin-2-yl)phenyl)methanone (7f): **^{1}H NMR ($CDCl_3$, 600 MHz)**

NK-2PPA-6-1H

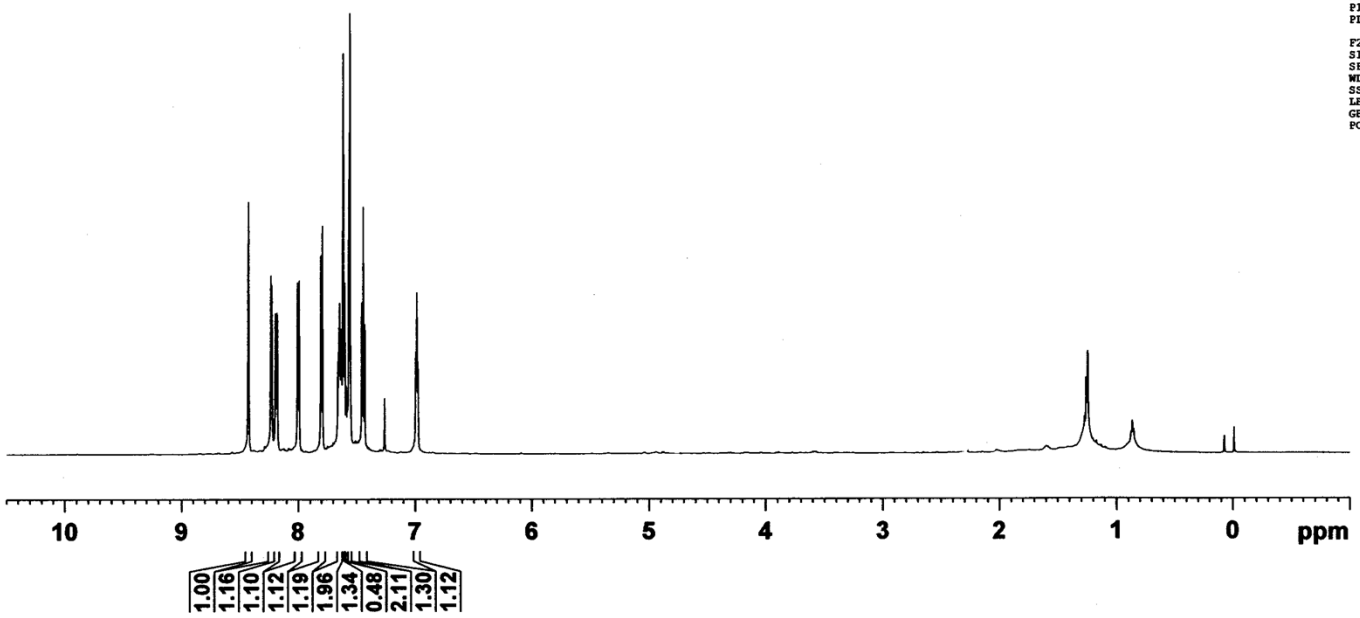



```
Current Data Parameters
NAME          NK-2PPA-6-1H
EXPNO                    1
PROCNO                   1

F2 - Acquisition Parameters
Date_             20140425
Time                 10.21
INSTRUM              spect
PROBHD    5 mm PABBO BB/
PULPROG              zg30
TD                  32768
SOLVENT             CDCl3
NS                     16
DS                      2
SWH            12019.230 Hz
FIDRES          0.366798 Hz
AQ              1.3631488 sec
RG                  27.82
DW                41.600 usec
DE                 6.50 usec
TE                301.3 K
D1             1.00000000 sec
TD0                     1

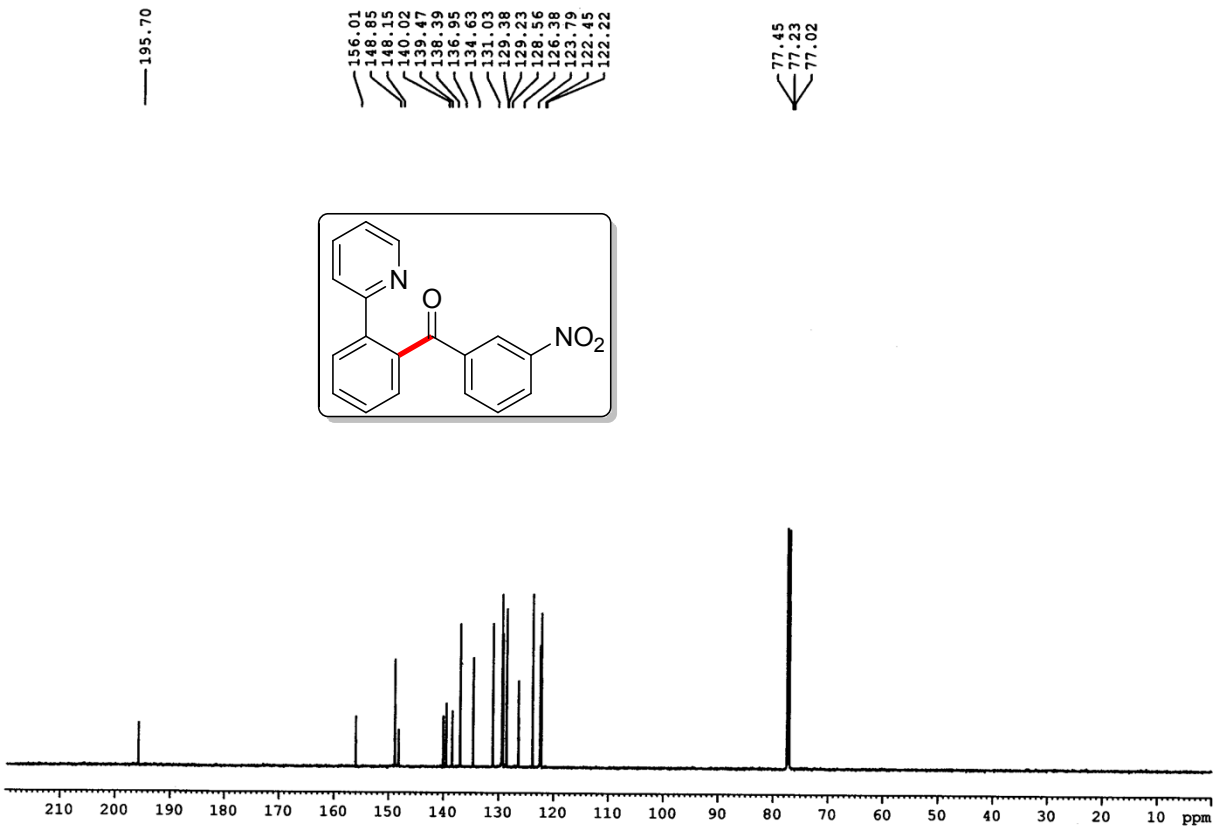
======== CHANNEL f1 ========
SFO1          600.1737063 MHz
NUC1                    1H
P1                  12.00 usec
PLW1         21.00000000 W

F2 - Processing parameters
SI                  16384
SF            600.1700147 MHz
WDW                    EM
SSB       0
LB                  0.30 Hz
GB        0
PC                  1.00
```



(3-Nitrophenyl)(2-(pyridin-2-yl)phenyl)methanone (7f): **^{13}C NMR ($CDCl_3$, 150 MHz)**

NK-2PPA-6-13C




```
Current Data Parameters
NAME       NK-2PPA-6-13C
EXPNO                  1
PROCNO                 1

F2 - Acquisition Parameters
Date_           20140425
Time               10.32
INSTRUM            spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD                32768
SOLVENT           CDCl3
NS                  342
DS                    2
SWH           36057.691 Hz
FIDRES         1.100393 Hz
AQ             0.4543829 sec
RG                65.24
DW               13.867 usec
DE                6.50 usec
TE                302.2 K
D1            2.00000000 sec
D11           0.03000000 sec
TD0                   1

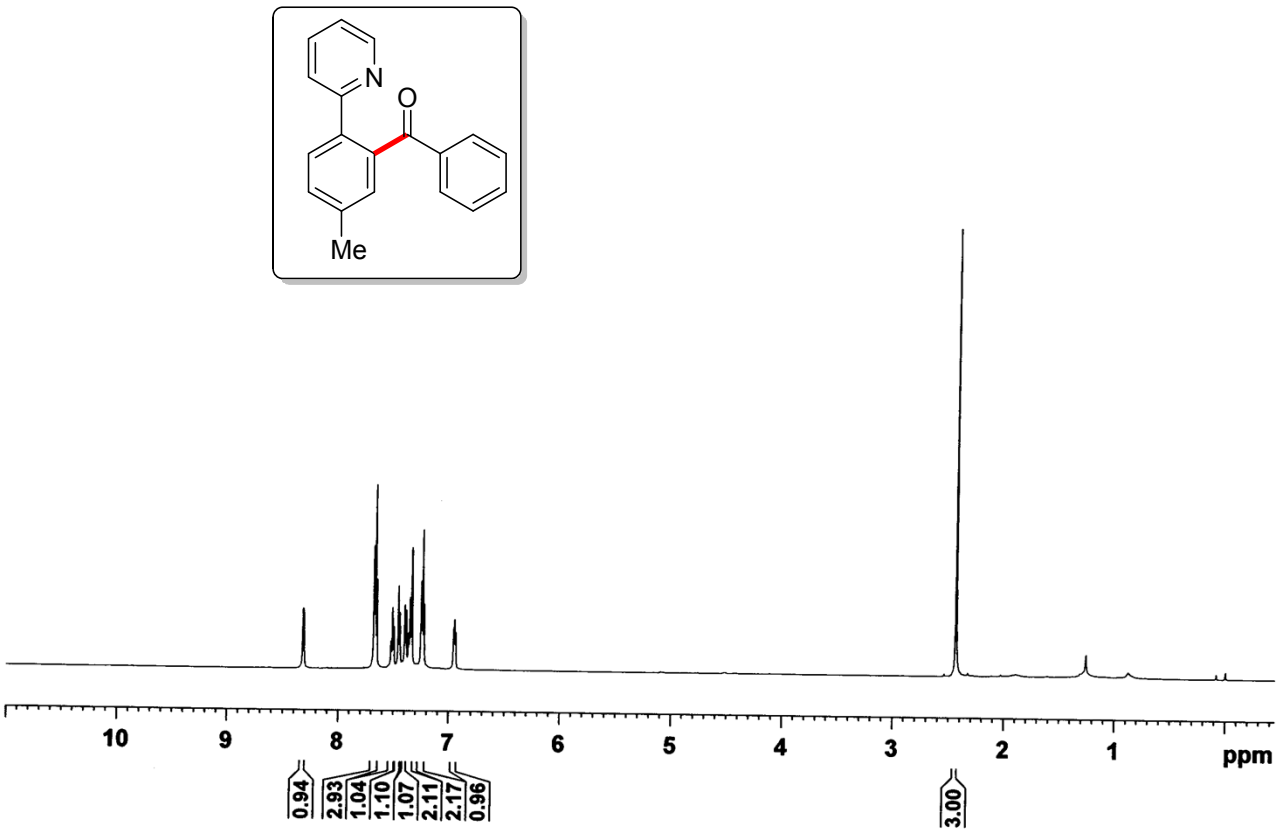
======== CHANNEL f1 ========
SFO1         150.9279571 MHz
NUC1                 13C
P1                10.50 usec
PLW1         95.00000000 W

======== CHANNEL f2 ========
SFO2         600.1724007 MHz
NUC2                 1H
CPDPRG[2          waltz16
PCPD2             70.00 usec
PLW2         21.00000000 W
PLW12         0.61714000 W
PLW13         0.30239999 W

F2 - Processing parameters
SI                  16384
SF           150.9128415 MHz
WDW                    EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 1.40
```

(5-Methyl-2-(pyridin-2-yl)phenyl)(phenyl)methanone (8a): **^{1}H NMR ($CDCl_3$, 600 MHz)**

NK-22PPA-2_1H



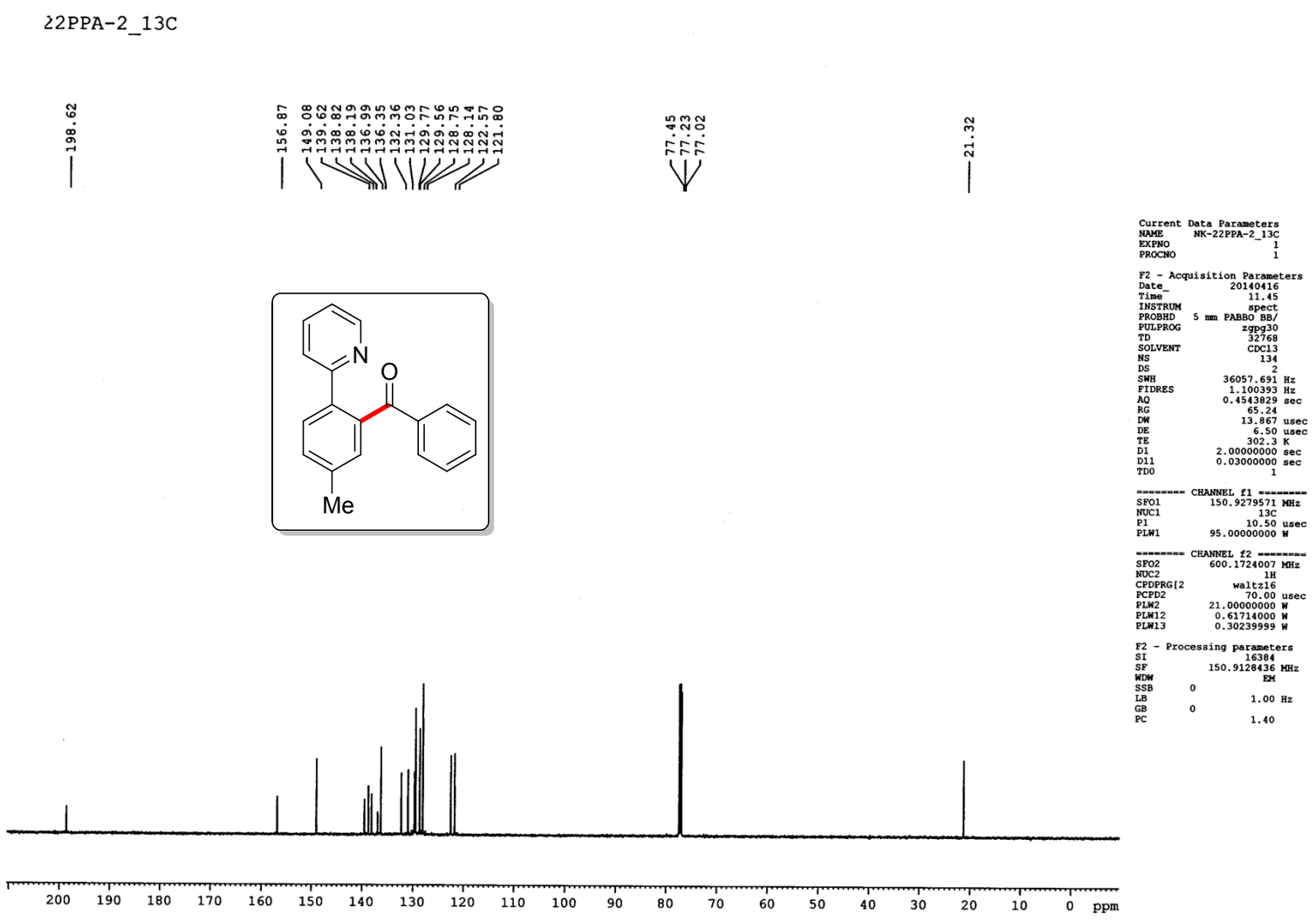

```
Current Data Parameters
NAME          NK-22PPA-2_1H
EXPNO                    1
PROCNO                   1

F2 - Acquisition Parameters
Date_              20140416
Time                 11.37
INSTRUM              spect
PROBHD    5 mm PABBO BB/
PULPROG              zg30
TD                  32768
SOLVENT             CDCl3
NS                     16
DS                      2
SWH             12019.230 Hz
FIDRES          0.366798 Hz
AQ              1.3631488 sec
RG                  27.82
DW                 41.600 usec
DE                  6.50 usec
TE                 301.3 K
D1              1.00000000 sec
TD0                     1

======== CHANNEL f1 ========
SFO1           600.1737063 MHz
NUC1                   1H
P1                  12.00 usec
PLW1           21.00000000 W

F2 - Processing parameters
SI                  16384
SF             600.1700162 MHz
WDW                    EM
SSB         0
LB                  0.30 Hz
GB          0
PC                  1.00
```

(5-Methyl-2-(pyridin-2-yl)phenyl)(phenyl)methanone (8a): **^{13}C NMR ($CDCl_3$, 150 MHz)**




```
Current Data Parameters
NAME      NK-22PPA-2_13C
EXPNO                 1
PROCNO                1

F2 - Acquisition Parameters
Date_          20140416
Time              11.45
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD              32768
SOLVENT           CDCl3
NS                  134
DS                    2
SWH           36057.691 Hz
FIDRES         1.100393 Hz
AQ            0.4543829 sec
RG                65.24
DW               13.867 usec
DE                6.50 usec
TE               302.3 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                   1

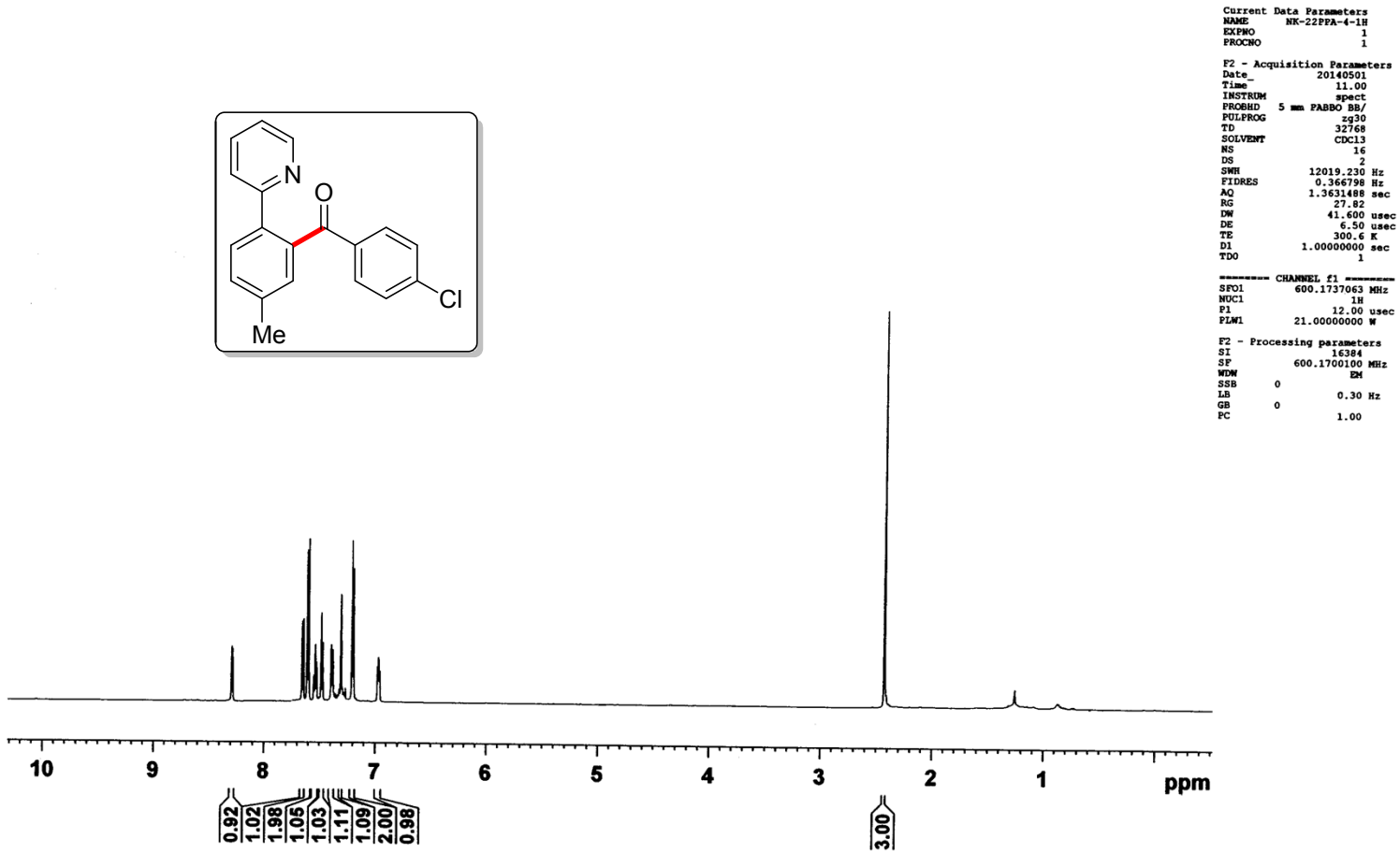
========== CHANNEL f1 ==========
SFO1        150.9279571 MHz
NUC1                13C
P1                10.50 usec
PLW1        95.00000000 W

========== CHANNEL f2 ==========
SFO2        600.1724007 MHz
NUC2                1H
CPDPRG[2          waltz16
PCPD2            70.00 usec
PLW2        21.00000000 W
PLW12        0.61714000 W
PLW13        0.30239999 W

F2 - Processing parameters
SI                 16384
SF          150.9128436 MHz
WDW                   EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 1.40
```

(4-Chlorophenyl)(5-methyl-2-(pyridin-2-yl)phenyl)methanone (8d): **^{1}H NMR ($CDCl_3$, 600 MHz)**

NK-22PPA-4-1H



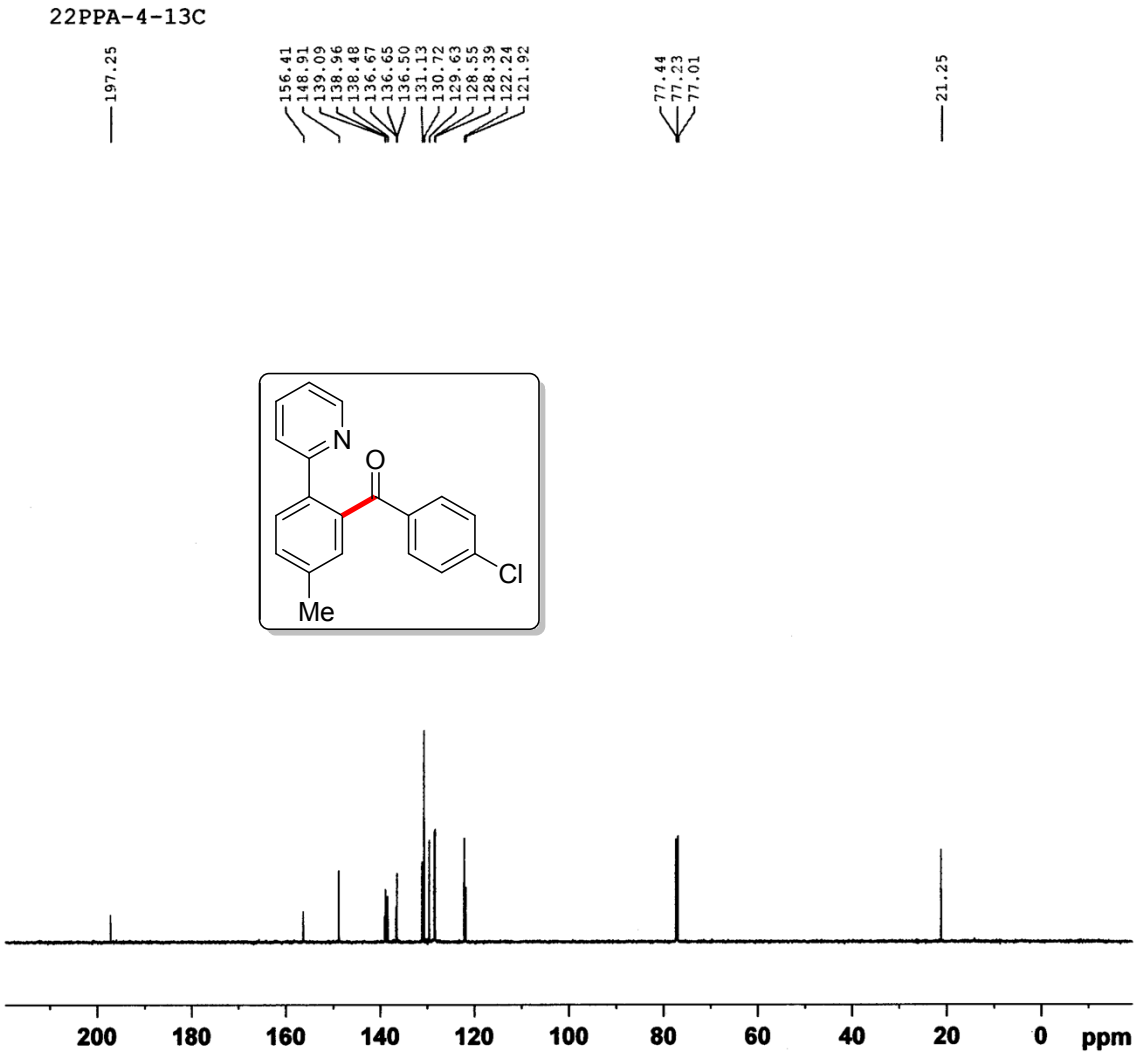

```
Current Data Parameters
NAME          NK-22PPA-4-1H
EXPNO                    1
PROCNO                   1

F2 - Acquisition Parameters
Date_              20140501
Time                 11.00
INSTRUM              spect
PROBHD   5 mm PABBO BB/
PULPROG              zg30
TD                  32768
SOLVENT              CDCl3
NS                      16
DS                       2
SWH              12019.230 Hz
FIDRES           0.366798 Hz
AQ               1.3631488 sec
RG                   27.82
DW                 41.600 usec
DE                  6.50 usec
TE                 300.6 K
D1              1.00000000 sec
TD0                      1

======== CHANNEL f1 ========
SFO1          600.1737063 MHz
NUC1                    1H
P1                   12.00 usec
PLW1         21.00000000 W

F2 - Processing parameters
SI                   16384
SF            600.1700100 MHz
WDW                     EM
SSB          0
LB                    0.30 Hz
GB           0
PC                    1.00
```

(4-Chlorophenyl)(5-methyl-2-(pyridin-2-yl)phenyl)methanone (8d): ^{13}C NMR ($CDCl_3$, 150 MHz)




```
Current Data Parameters
NAME      NK-22PPA-4-13C
EXPNO                 1
PROCNO                1

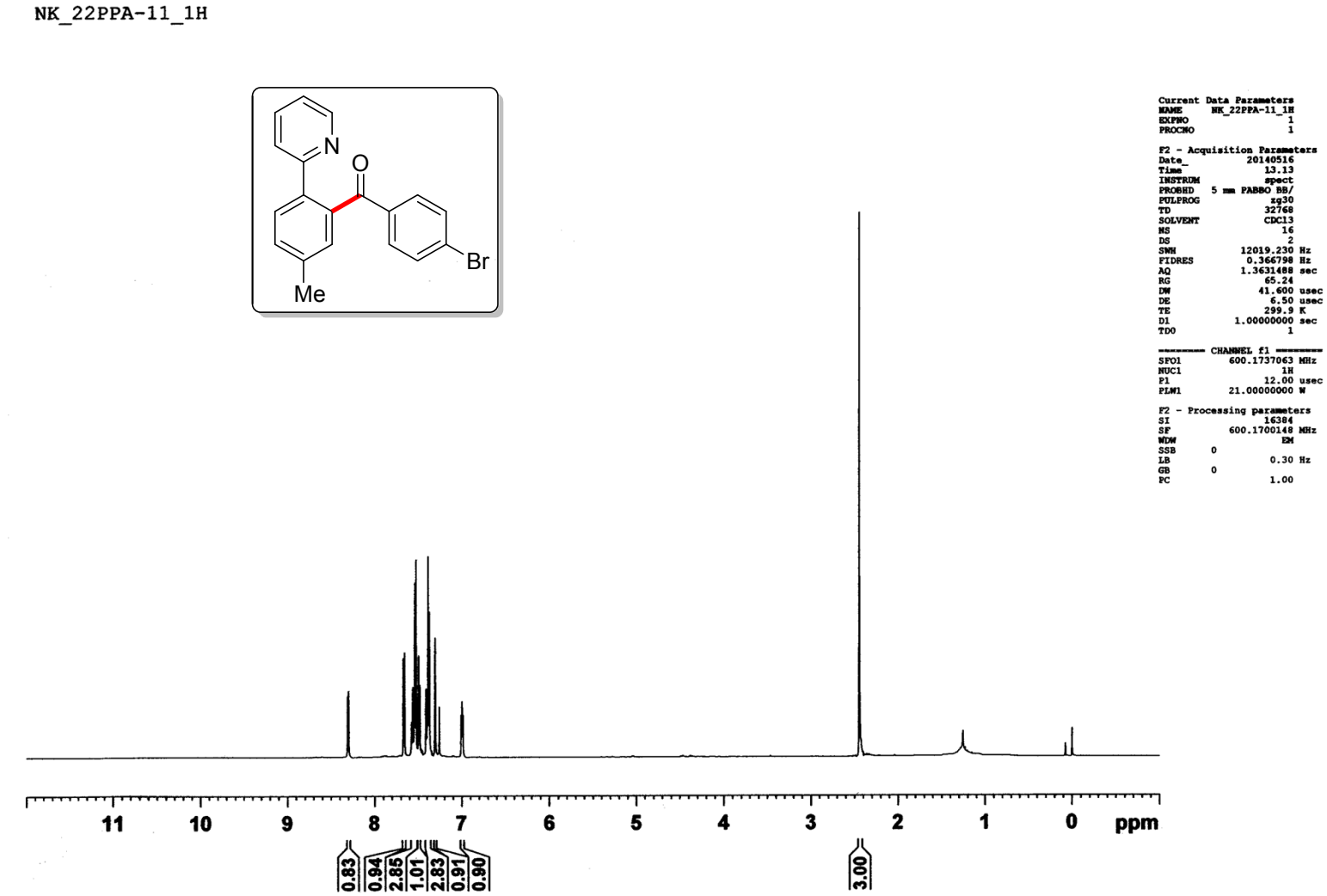
F2 - Acquisition Parameters
Date_          20140501
Time              11.06
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD               32768
SOLVENT          CDC13
NS                  25
DS                   2
SWH          36057.691 Hz
FIDRES        1.100393 Hz
AQ           0.4543829 sec
RG               65.24
DW              13.867 usec
DE                6.50 usec
TE              300.8 K
D1          2.00000000 sec
D11         0.03000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1        150.9279571 MHz
NUC1               13C
P1               10.50 usec
PLW1        95.00000000 W

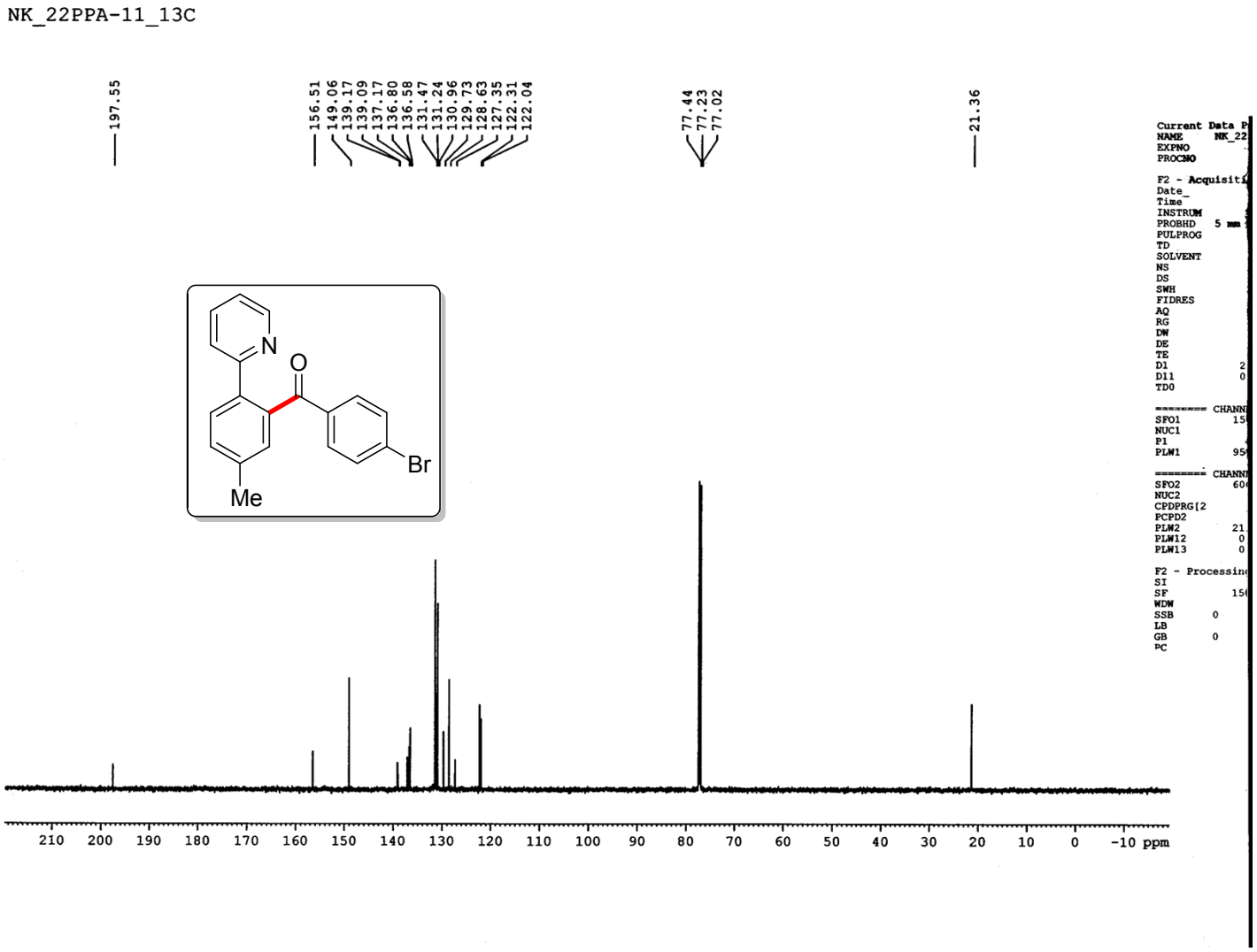
======== CHANNEL f2 ========
SFO2        600.1724007 MHz
NUC2               1H
CPDPRG[2        waltz16
PCPD2            70.00 usec
PLW2        21.00000000 W
PLW12        0.61714000 W
PLW13        0.30239999 W

F2 - Processing parameters
SI                16384
SF          150.9128543 MHz
WDW                EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.40
```

(4-Bromophenyl)(5-methyl-2-(pyridin-2-yl)phenyl)methanone (8e): **^{1}H NMR ($CDCl_3$, 600 MHz)**

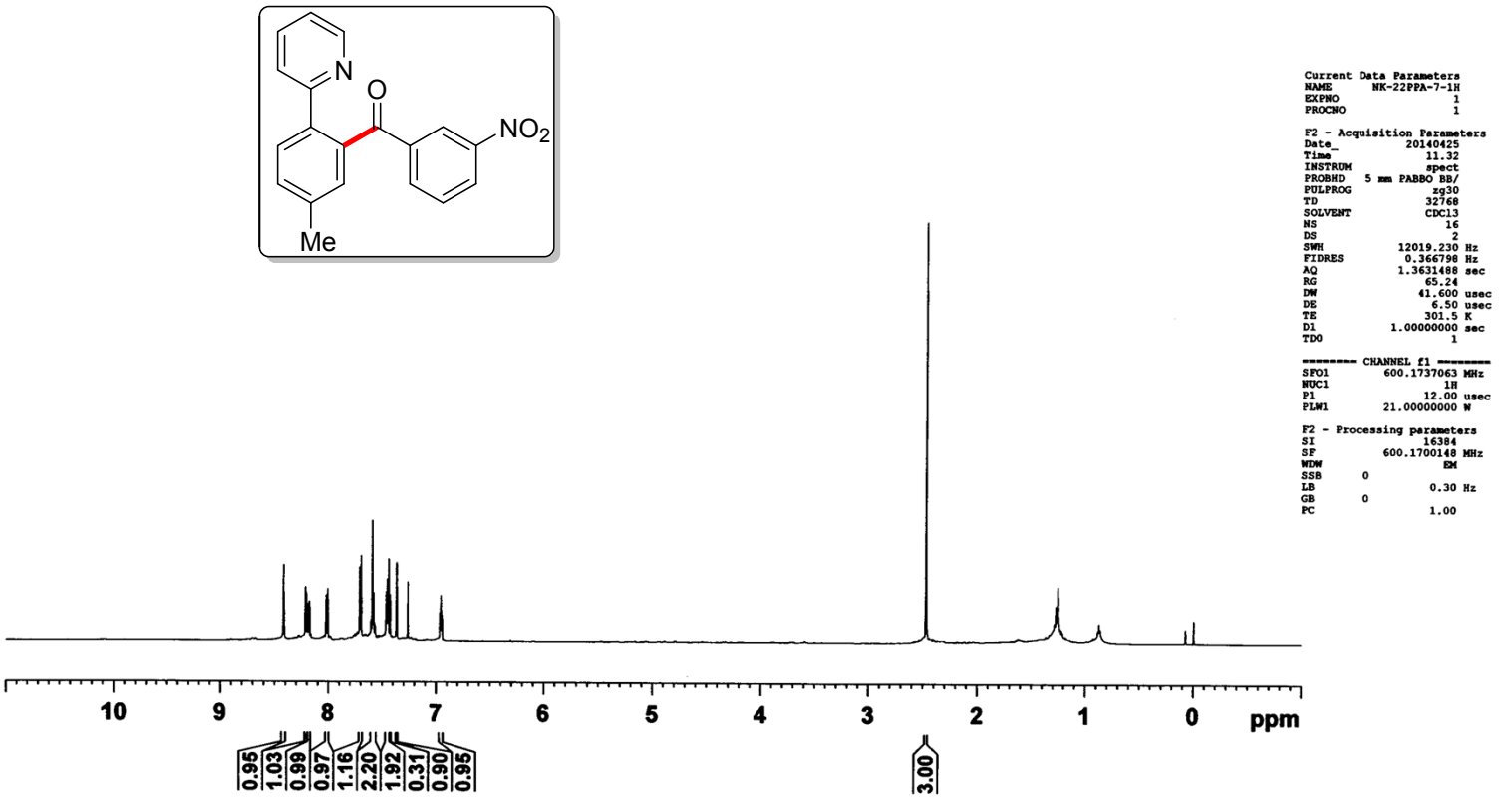


(4-Bromophenyl)(5-methyl-2-(pyridin-2-yl)phenyl)methanone (8e): **^{13}C NMR ($CDCl_3$, 150 MHz)**



(5-Methyl-2-(pyridin-2-yl)phenyl)(3-nitrophenyl)methanone (8f): **^{1}H NMR ($CDCl_3$, 600 MHz)**

NK-22PPA-7-1H

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Current Data Parameters
NAME       NK-22PPA-7-1H
EXPNO                 1
PROCNO                1

F2 - Acquisition Parameters
Date_          20140425
Time              11.32
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG            zg30
TD                32768
SOLVENT           CDCl3
NS                   16
DS                    2
SWH           12019.230 Hz
FIDRES        0.366798 Hz
AQ            1.3631488 sec
RG                65.24
DW               41.600 usec
DE                6.50 usec
TE                301.5 K
D1           1.00000000 sec
TD0                   1

======== CHANNEL f1 ========
SFO1         600.1737063 MHz
NUC1                 1H
P1                12.00 usec
PLW1         21.00000000 W

F2 - Processing parameters
SI                16384
SF           600.1700148 MHz
WDW                  EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
```
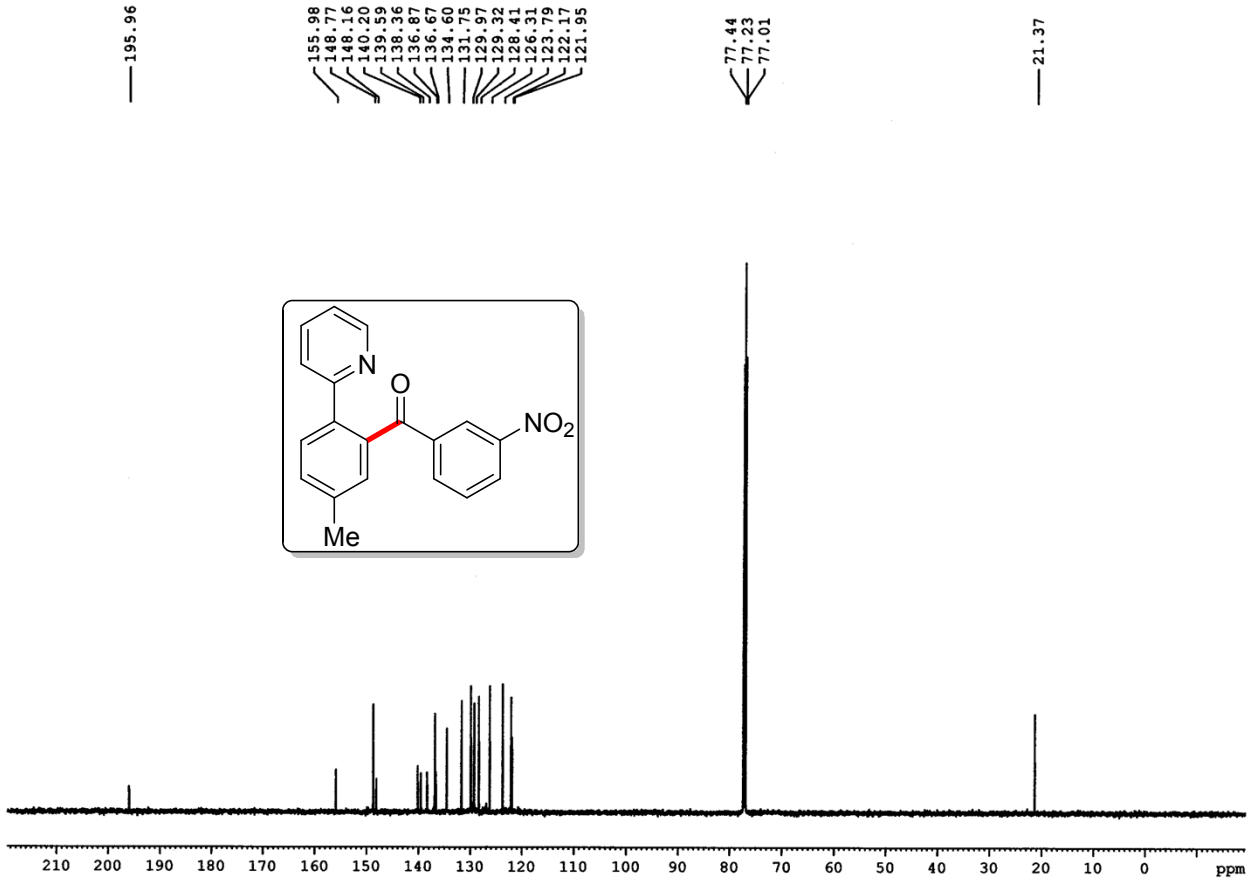

(5-Methyl-2-(pyridin-2-yl)phenyl)(3-nitrophenyl)methanone (8f): ^{13}C NMR ($CDCl_3$, 150 MHz)

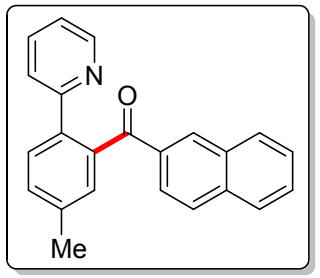
NK-22PPA-7-13C



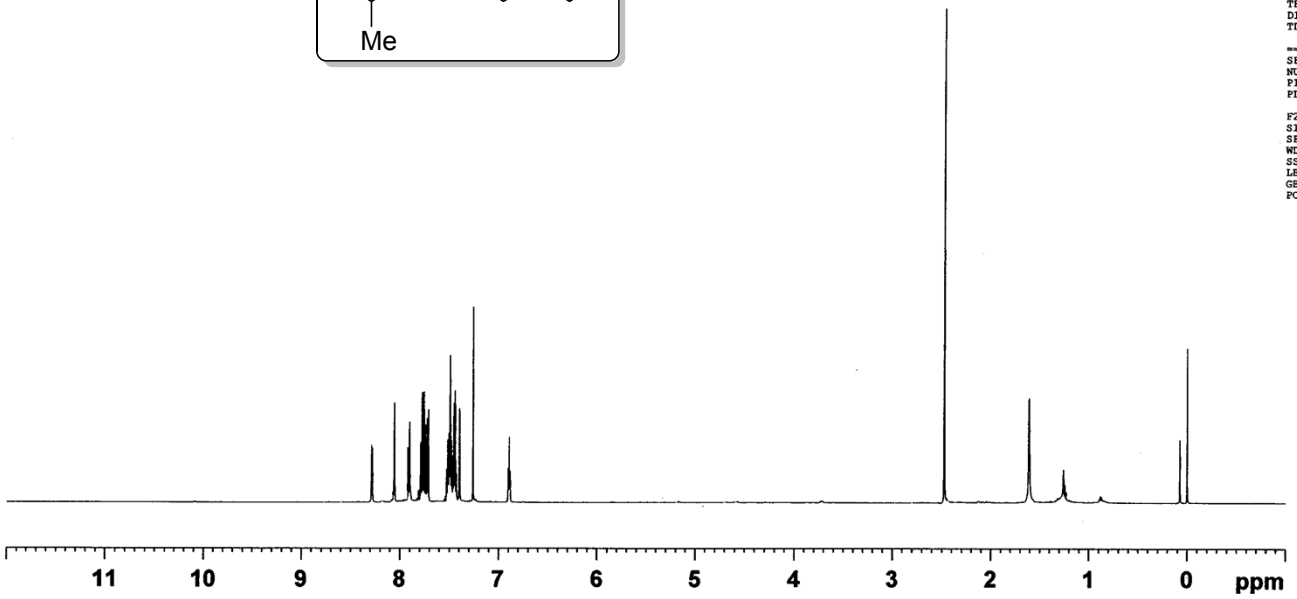

```
Current Data Parameters
NAME      NK-22PPA-7-13C
EXPNO                  1
PROCNO                 1

F2 - Acquisition Parameters
Date_           20140425
Time              11.41
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD              32768
SOLVENT           CDCl3
NS                  322
DS                    2
SWH           36057.691 Hz
FIDRES         1.100393 Hz
AQ             0.4543829 sec
RG                65.24
DW               13.867 usec
DE                6.50 usec
TE               301.9 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
SFO1        150.9279571 MHz
NUC1               13C
P1               10.50 usec
PLW1         95.00000000 W

======== CHANNEL f2 ========
SFO2        600.1724007 MHz
NUC2               1H
CPDPRG[2        waltz16
PCPD2            70.00 usec
PLW2         21.00000000 W
PLW12         0.61714000 W
PLW13         0.30239999 W

F2 - Processing parameters
SI                 16384
SF          150.9128375 MHz
WDW                   EM
SSB       0
LB                 1.00 Hz
GB        0
PC                 1.40
```

(5-Methyl-2-(pyridin-2-yl)phenyl)(naphthalen-2-yl)methanone (8g): **^{1}H NMR ($CDCl_3$, 600 MHz)**

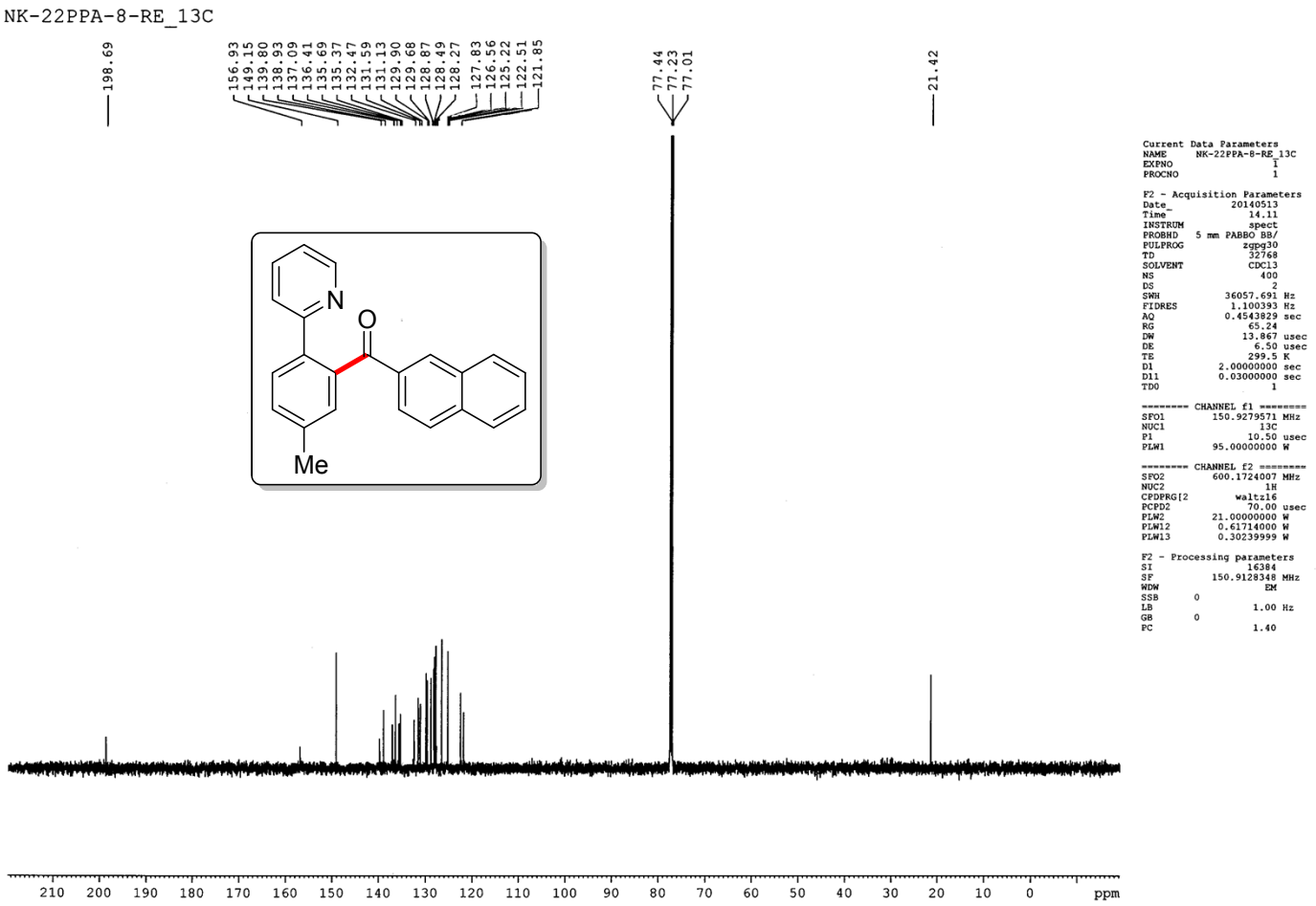
NK-22PPA-8-RE_1H




```
Current Data Parameters
NAME        NK-22PPA-8-RE_1H
EXPNO                      1
PROCNO                     1

F2 - Acquisition Parameters
Date_              20140513
Time                  14.01
INSTRUM                spect
PROBHD    5 mm PABBO BB/
PULPROG                zg30
TD                    32768
SOLVENT               CDCl3
NS                       16
DS                        2
SWH               12019.230 Hz
FIDRES            0.366798 Hz
AQ                1.3631488 sec
RG                      113
DW                  41.600 usec
DE                   6.50 usec
TE                  299.3 K
D1                1.00000000 sec
TD0                       1

======== CHANNEL f1 ========
SFO1            600.1737063 MHz
NUC1                      1H
P1                     12.00 usec
PLW1           21.00000000 W

F2 - Processing parameters
SI                    16384
SF              600.1700148 MHz
WDW                     EM
SSB          0
LB                     0.30 Hz
GB           0
PC                     1.00
```



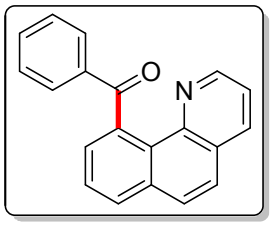
(5-Methyl-2-(pyridin-2-yl)phenyl)(naphthalen-2-yl)methanone (8g): **^{13}C NMR ($CDCl_3$, 150 MHz)**



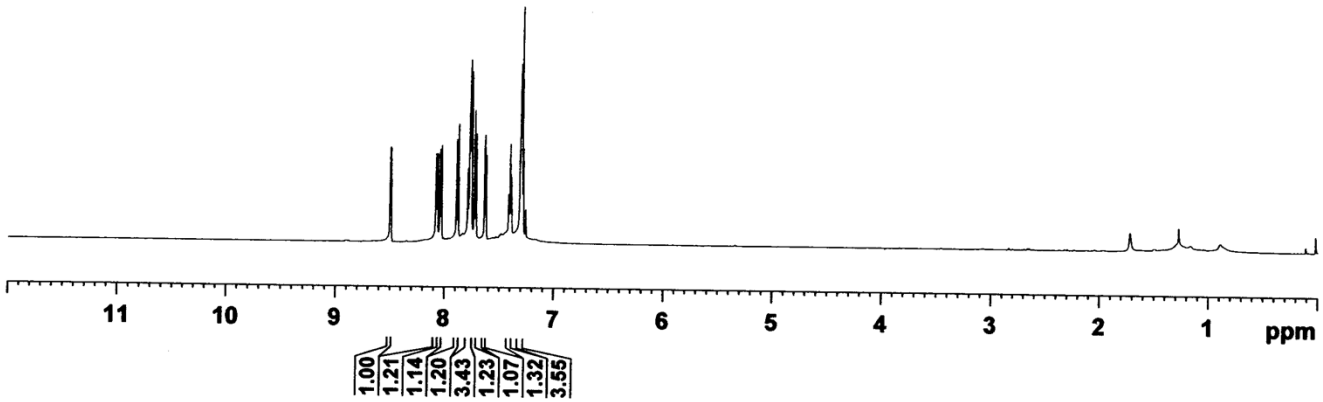

```
Current Data Parameters
NAME      NK-22PPA-8-RE_13C
EXPNO                    1
PROCNO                   1

F2 - Acquisition Parameters
Date_             20140513
Time                14.11
INSTRUM             spect
PROBHD   5 mm PABBO BB/
PULPROG          zgpg30
TD                 32768
SOLVENT            CDCl3
NS                   400
DS                     2
SWH            36057.691 Hz
FIDRES          1.100393 Hz
AQ             0.4543829 sec
RG                 65.24
DW                13.867 usec
DE                 6.50 usec
TE                299.5 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                    1

======== CHANNEL f1 ========
SFO1          150.9279571 MHz
NUC1                 13C
P1                 10.50 usec
PLW1          95.00000000 W

======== CHANNEL f2 ========
SFO2          600.1724007 MHz
NUC2                 1H
CPDPRG[2          waltz16
PCPD2              70.00 usec
PLW2          21.00000000 W
PLW12          0.61714000 W
PLW13          0.30239999 W

F2 - Processing parameters
SI                   16384
SF            150.9128348 MHz
WDW                    EM
SSB       0
LB                  1.00 Hz
GB        0
PC                  1.40
```

Benzo[*h*]quinolin-10-yl(phenyl)methanone (9a): ^{1}H NMR ($CDCl_3$, 600 MHz)

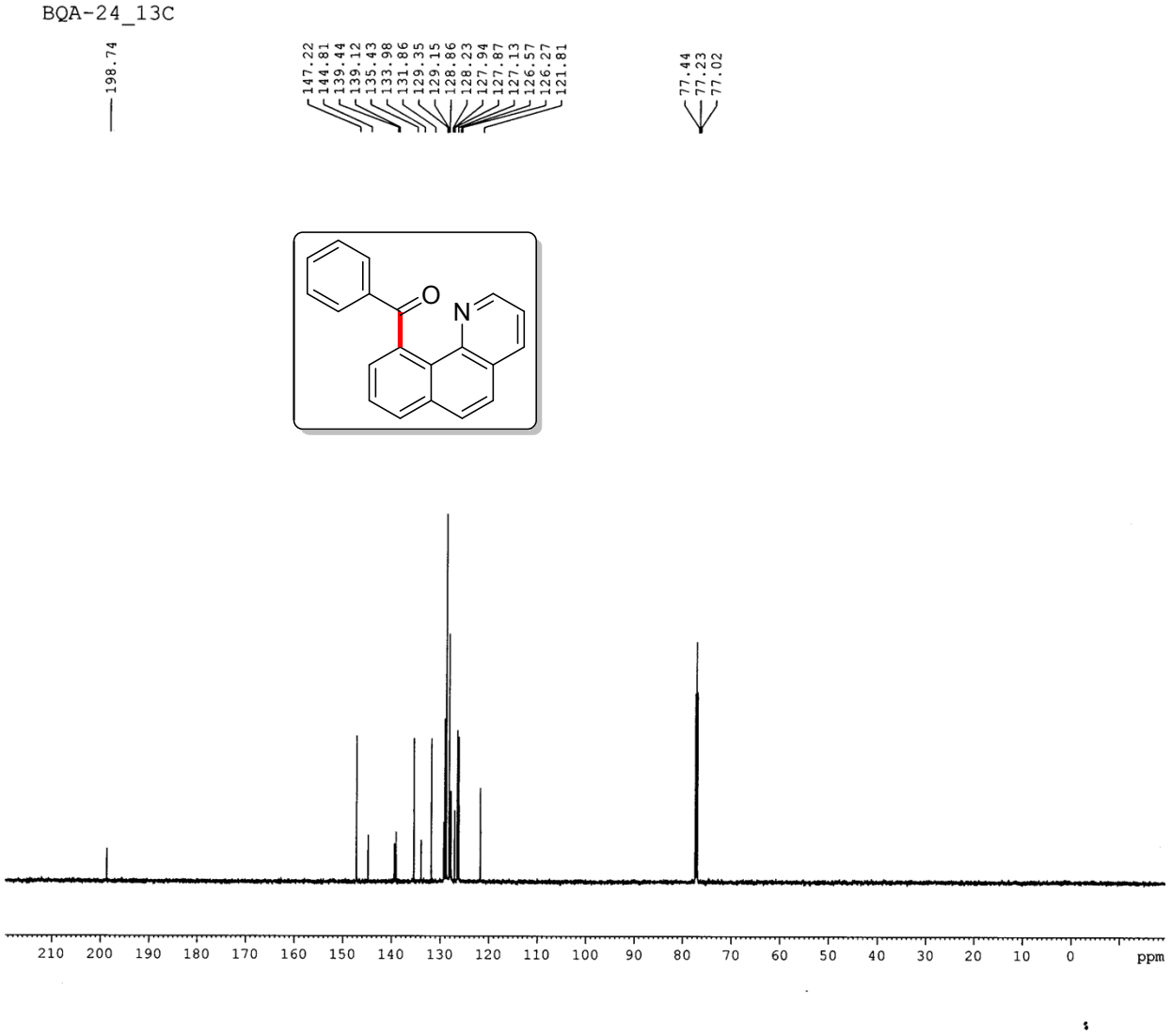
NK-BQA-24_1H




```
Current Data Parameters
NAME          NK-BQA-24_1H
EXPNO                    1
PROCNO                   1

F2 - Acquisition Parameters
Date_              20140715
Time                 13.47
INSTRUM              spect
PROBHD   5 mm PABBO BB/
PULPROG              zg30
TD                  32768
SOLVENT             CDCl3
NS                     16
DS                      2
SWH             12019.230 Hz
FIDRES          0.366798 Hz
AQ              1.3631488 sec
RG                  27.82
DW                 41.600 usec
DE                  6.50 usec
TE                 300.5 K
D1              1.00000000 sec
TD0                     1

======== CHANNEL f1 ========
SFO1           600.1737063 MHz
NUC1                   1H
P1                  12.00 usec
PLW1           21.00000000 W

F2 - Processing parameters
SI                  16384
SF             600.1700148 MHz
WDW                    EM
SSB       0
LB                  0.30 Hz
GB        0
PC                  1.00
```



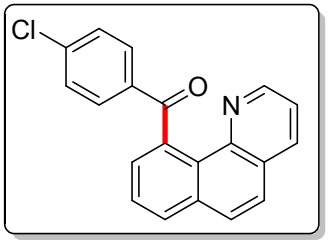
Benzo[*h*]quinolin-10-yl(phenyl)methanone (9a): **^{13}C NMR ($CDCl_3$, 150 MHz)**



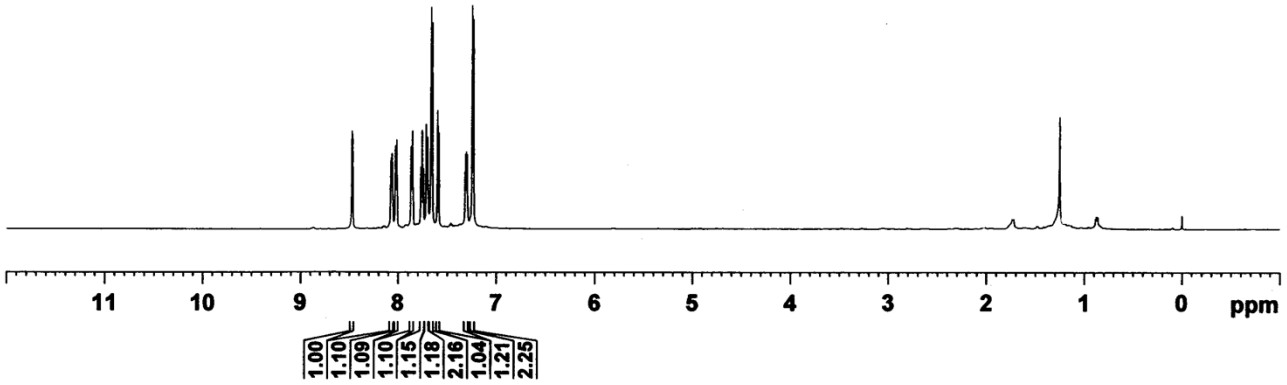

```
Current Data Parameters
NAME      NK-BQA-24_13C
EXPNO                 1
PROCNO                1

F2 - Acquisition Parameters
Date_          20140715
Time              13.54
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD                32768
SOLVENT           CDCl3
NS                  126
DS                    2
SWH           36057.691 Hz
FIDRES         1.100393 Hz
AQ            0.4543829 sec
RG                65.24
DW               13.867 usec
DE                6.50 usec
TE               300.9 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                   1

======== CHANNEL f1 ========
SFO1        150.9279571 MHz
NUC1                13C
P1                10.50 usec
PLW1        95.00000000 W

======== CHANNEL f2 ========
SFO2        600.1724007 MHz
NUC2                1H
CPDPRG[2         waltz16
PCPD2             70.00 usec
PLW2        21.00000000 W
PLW12        0.61714000 W
PLW13        0.30239999 W

F2 - Processing parameters
SI                16384
SF          150.9128457 MHz
WDW                 EM
SSB       0
LB                1.00 Hz
GB        0
PC                1.40
```

Benzo[*h*]quinolin-10-yl(4-chlorophenyl)methanone (9d): **^{1}H NMR ($CDCl_3$, 600 MHz)**

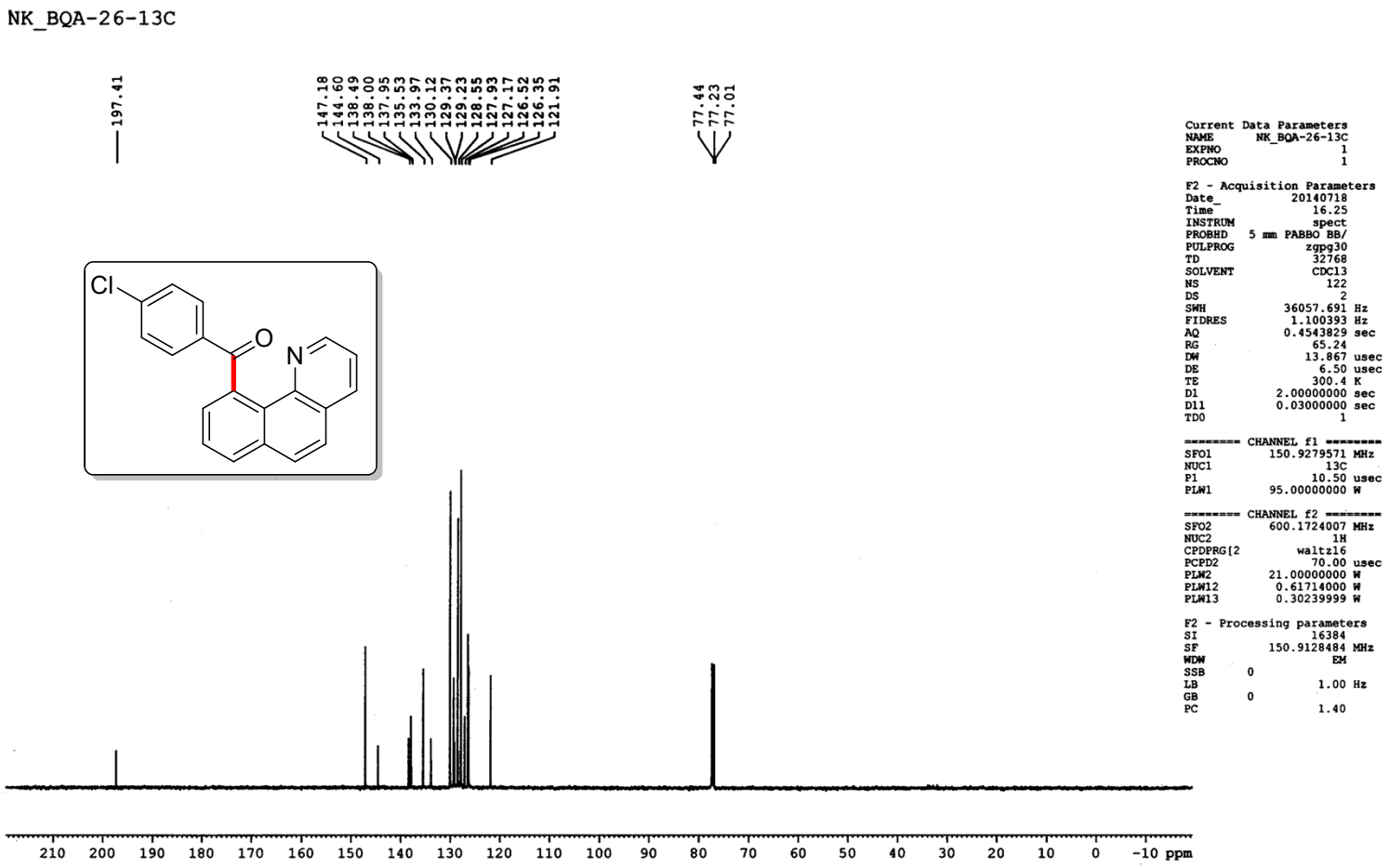
NK_BQA-26-1H




```
Current Data Parameters
NAME          NK_BQA-26-1H
EXPNO                    1
PROCNO                   1

F2 - Acquisition Parameters
Date_              20140718
Time                 16.18
INSTRUM              spect
PROBHD   5 mm PABBO BB/
PULPROG              zg30
TD                  32768
SOLVENT              CDCl3
NS                      16
DS                       2
SWH             12019.230 Hz
FIDRES              0.366798 Hz
AQ                  1.3631488 sec
RG                     25.04
DW                    41.600 usec
DE                     6.50 usec
TE                    300.0 K
D1                1.00000000 sec
TD0                      1

======== CHANNEL f1 ========
SFO1            600.1737063 MHz
NUC1                    1H
P1                     12.00 usec
PLW1           21.00000000 W

F2 - Processing parameters
SI                       16384
SF              600.1700240 MHz
WDW                      EM
SSB          0
LB                      0.30 Hz
GB           0
PC                      1.00
```

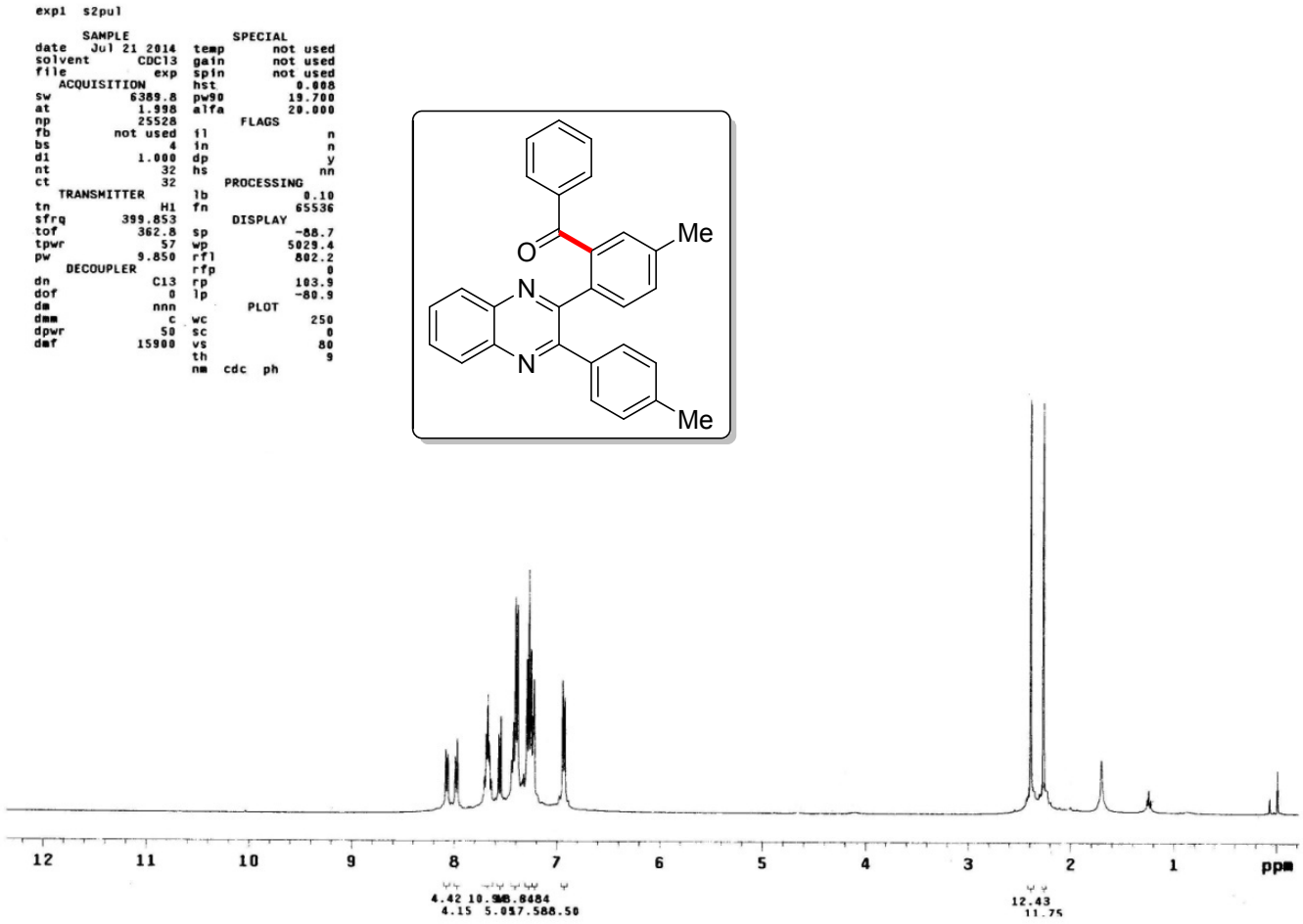


Benzo[*h*]quinolin-10-yl(4-chlorophenyl)methanone (9d): ^{13}C NMR ($CDCl_3$, 150 MHz)

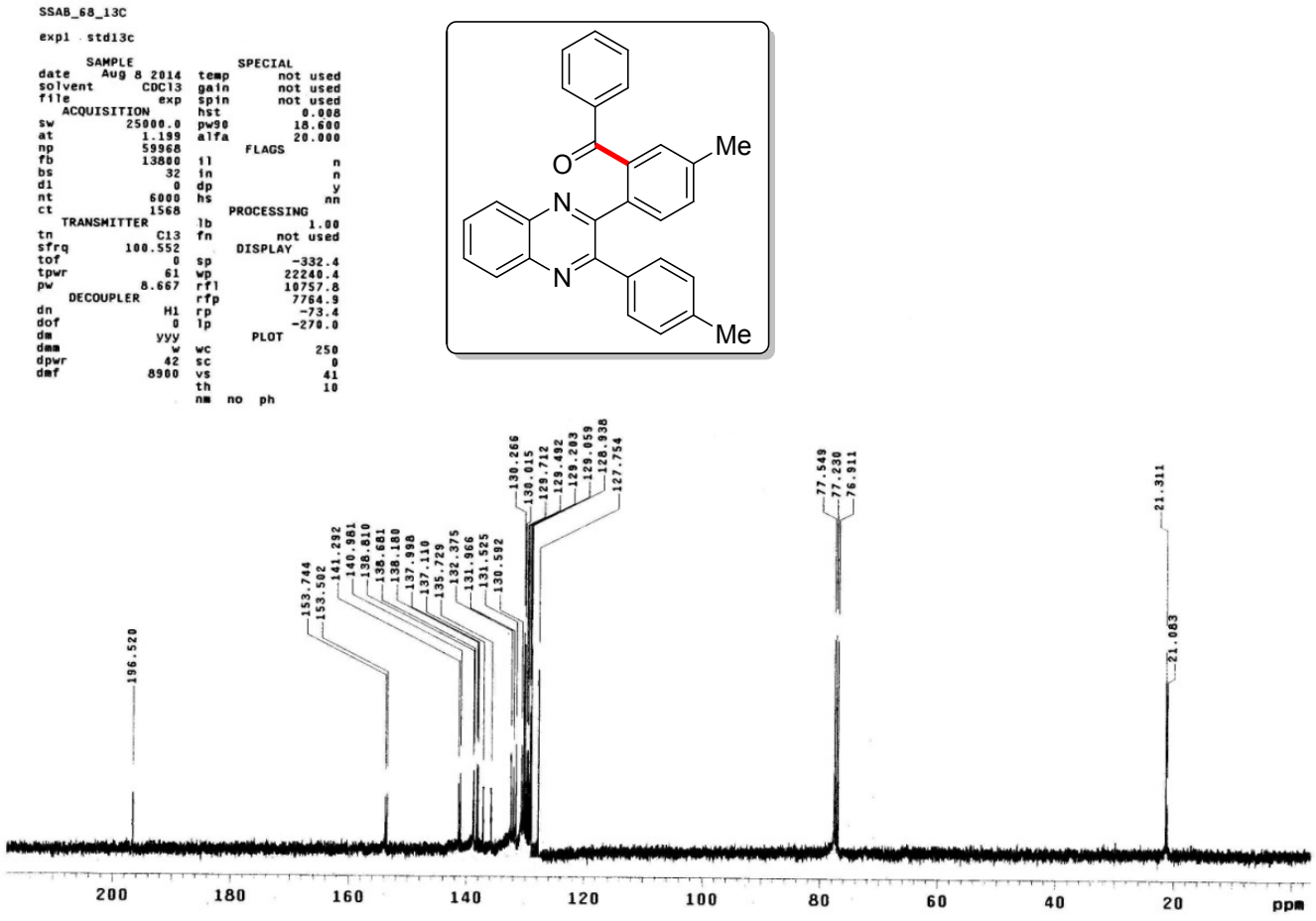



```
Current Data Parameters
NAME          NK_BQA-26-13C
EXPNO                     1
PROCNO                    1

F2 - Acquisition Parameters
Date_              20140718
Time                  16.25
INSTRUM               spect
PROBHD   5 mm PABBO BB/
PULPROG              zgpg30
TD                    32768
SOLVENT               CDCl3
NS                      122
DS                        2
SWH               36057.691 Hz
FIDRES             1.100393 Hz
AQ                 0.4543829 sec
RG                    65.24
DW                 13.867 usec
DE                  6.50 usec
TE                  300.4 K
D1                 2.00000000 sec
D11                0.03000000 sec
TD0                       1

======== CHANNEL f1 ========
SFO1            150.9279571 MHz
NUC1                    13C
P1                   10.50 usec
PLW1            95.00000000 W

======== CHANNEL f2 ========
SFO2            600.1724007 MHz
NUC2                    1H
CPDPRG[2             waltz16
PCPD2                70.00 usec
PLW2            21.00000000 W
PLW12            0.61714000 W
PLW13            0.30239999 W

F2 - Processing parameters
SI                      16384
SF              150.9128484 MHz
WDW                        EM
SSB          0
LB                    1.00 Hz
GB           0
PC                    1.40
```

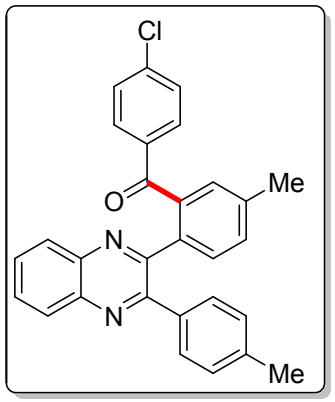
(5-Methyl-2-(3-(p-tolyl)quinoxalin-2-yl)phenyl)(phenyl)methanone (10a): **^{1}H NMR ($CDCl_3$, 400 MHz)**

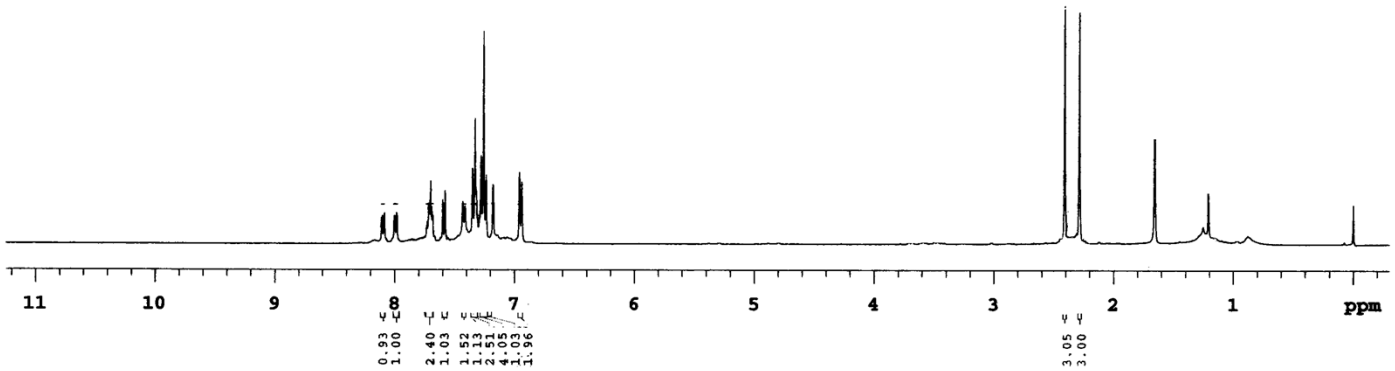


(5-Methyl-2-(3-(p-tolyl)quinoxalin-2-yl)phenyl)(phenyl)methanone (10a): **^{13}C NMR ($CDCl_3$, 100 MHz)**

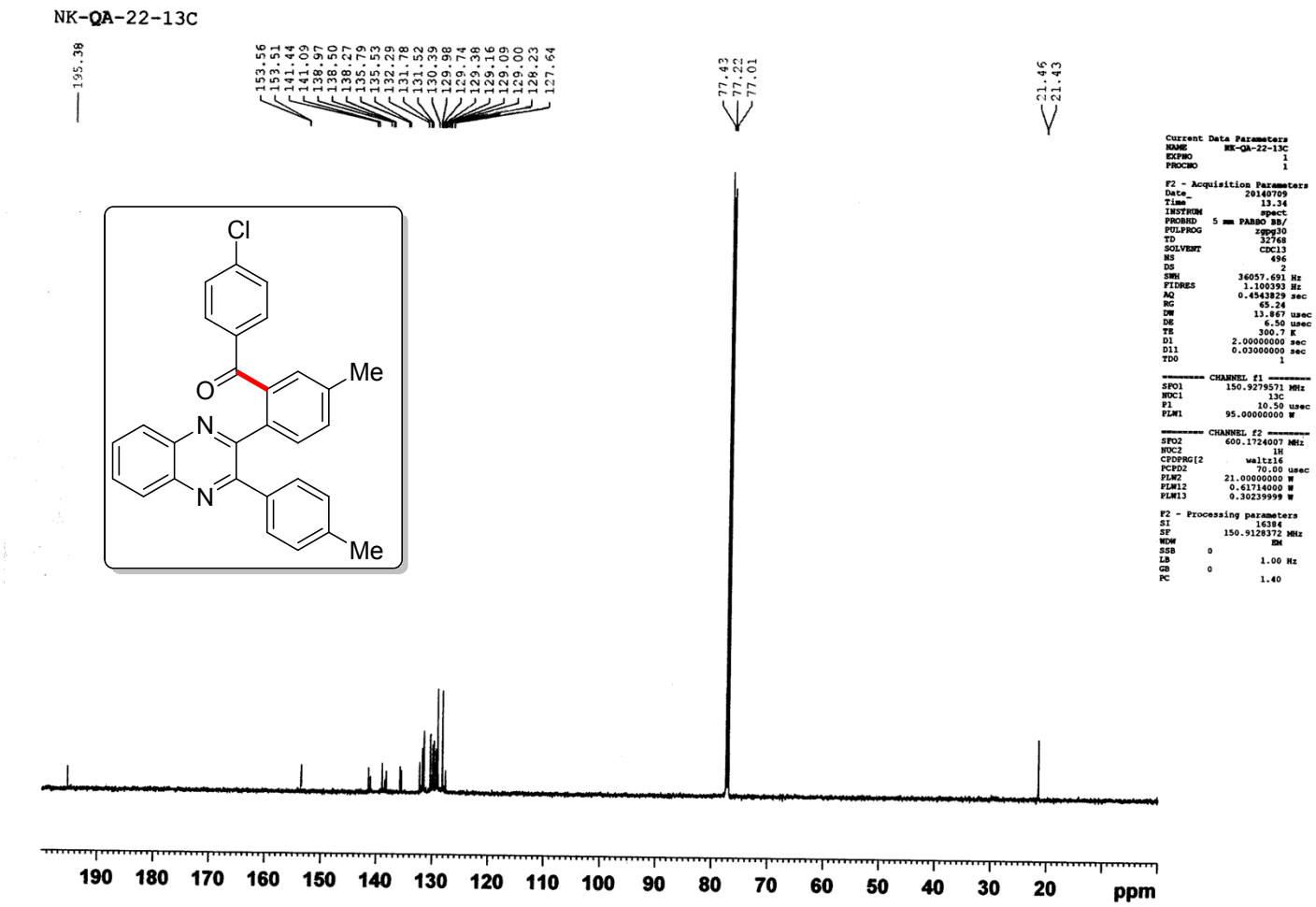


(4-Chlorophenyl)(5-methyl-2-(3-(p-tolyl)quinoxalin-2-yl)phenyl)methanone (10d): **^{1}H NMR ($CDCl_3$, 400 MHz)**

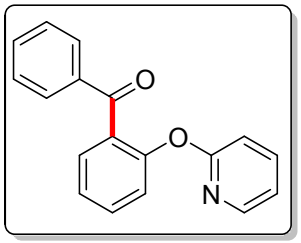


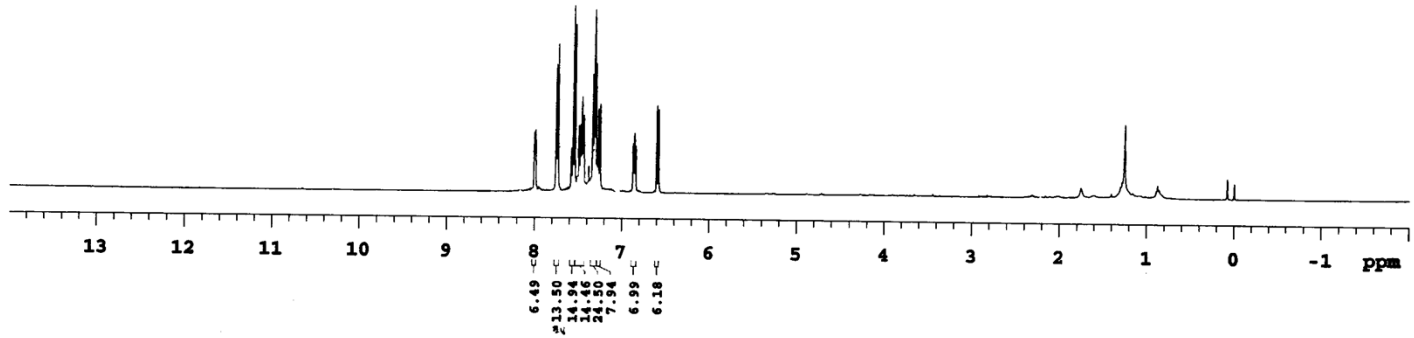


(4-Chlorophenyl)(5-methyl-2-(3-(p-tolyl)quinoxalin-2-yl)phenyl)methanone (10d): **^{13}C NMR ($CDCl_3$, 150 MHz)**



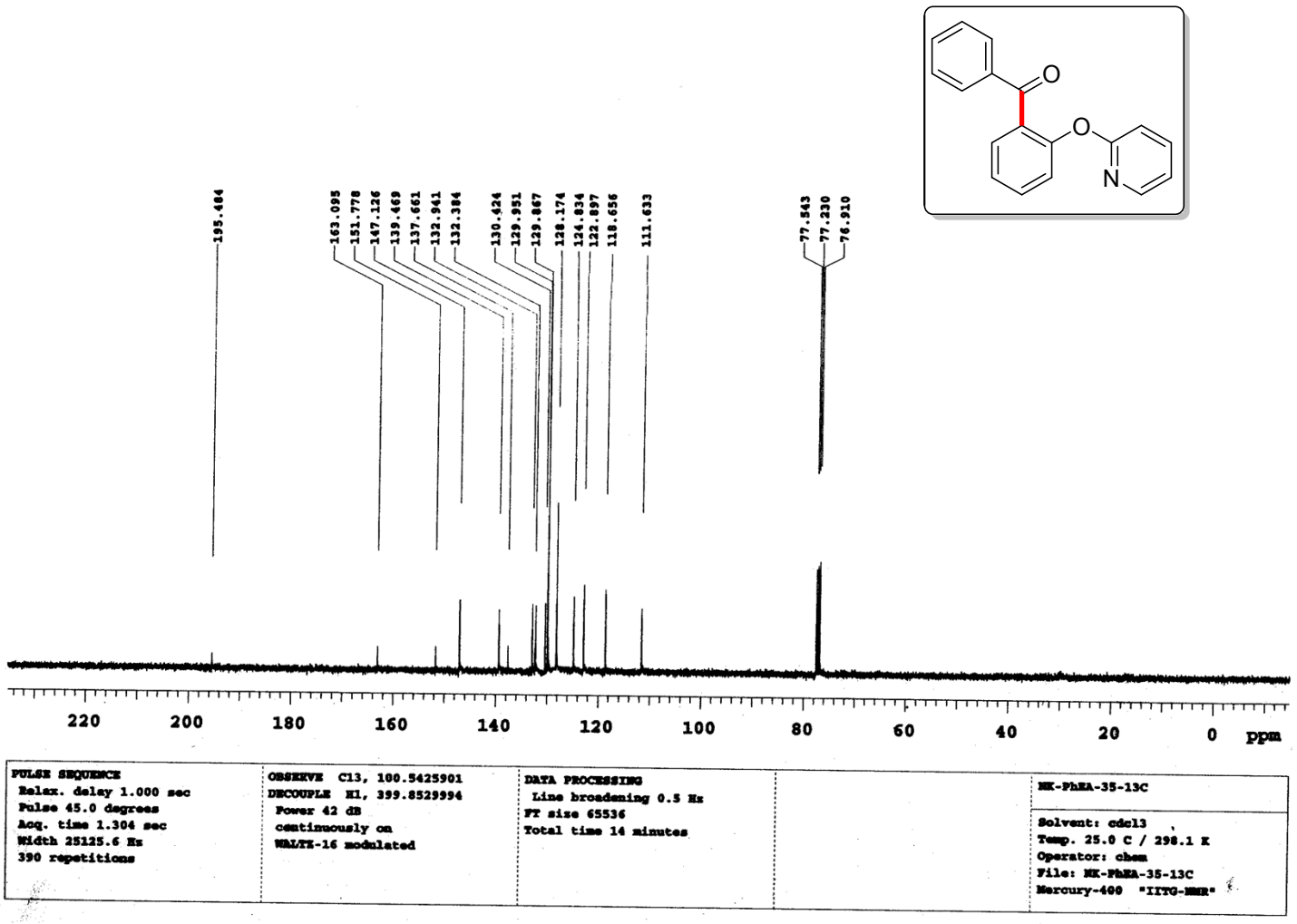
Phenyl(2-(pyridin-2-yloxy)phenyl)methanone (11a): ^{1}H NMR ($CDCl_3$, 400 MHz)



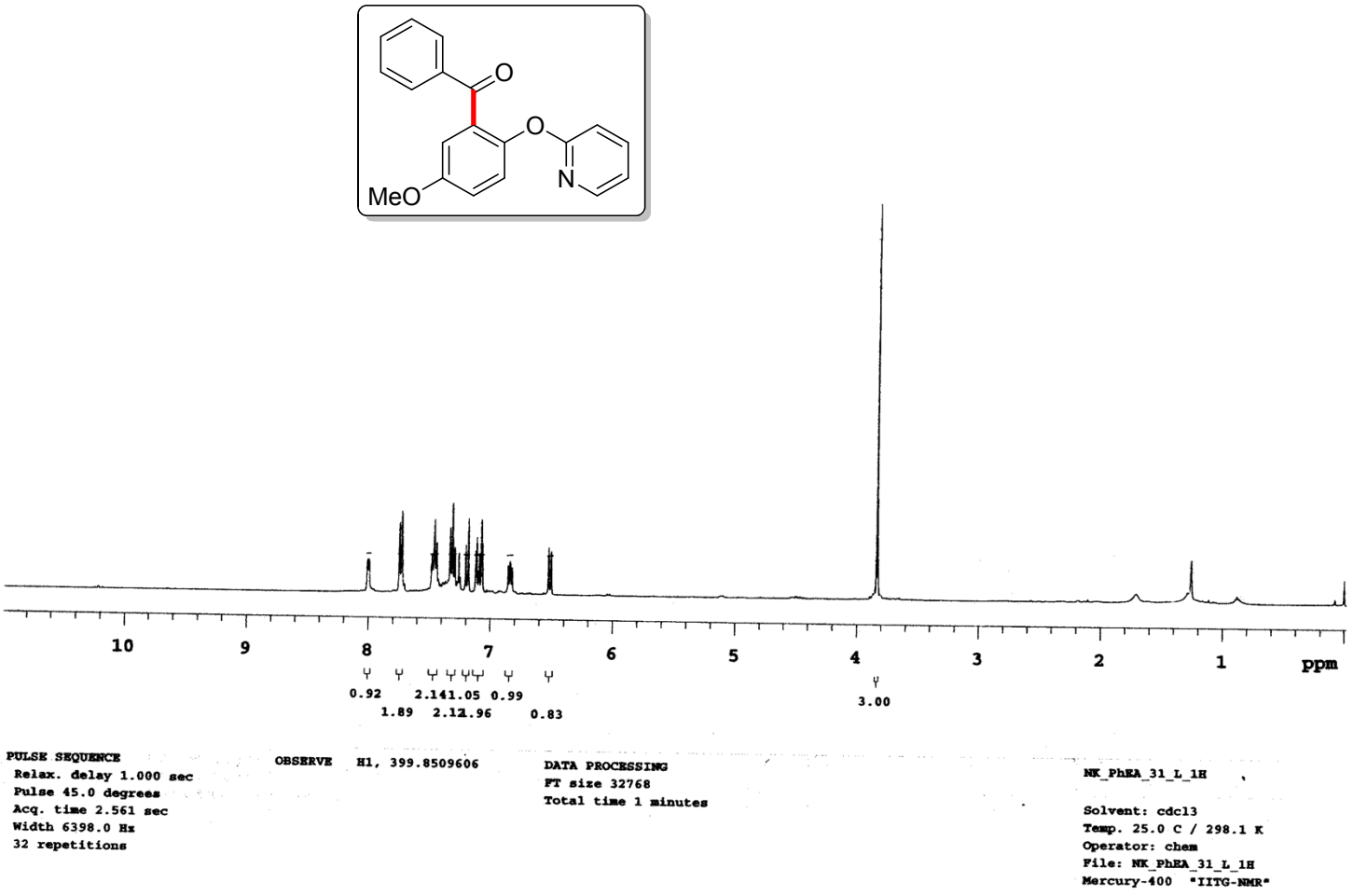


PULSE SEQUENCE Relax. delay 1.000 sec Pulse 45.0 degrees Acq. time 2.561 sec Width 6398.0 Hz 32 repetitions	OBSERVE H1, 399.8509658	DATA PROCESSING FT size 32768 Total time 1 minutes		MK_PhEA_35_1H Solvent: cdcl3 Temp. 25.0 C / 298.1 K Operator: chem File: MK_PhEA_35_1H Mercury-400 "IITG-NMR"

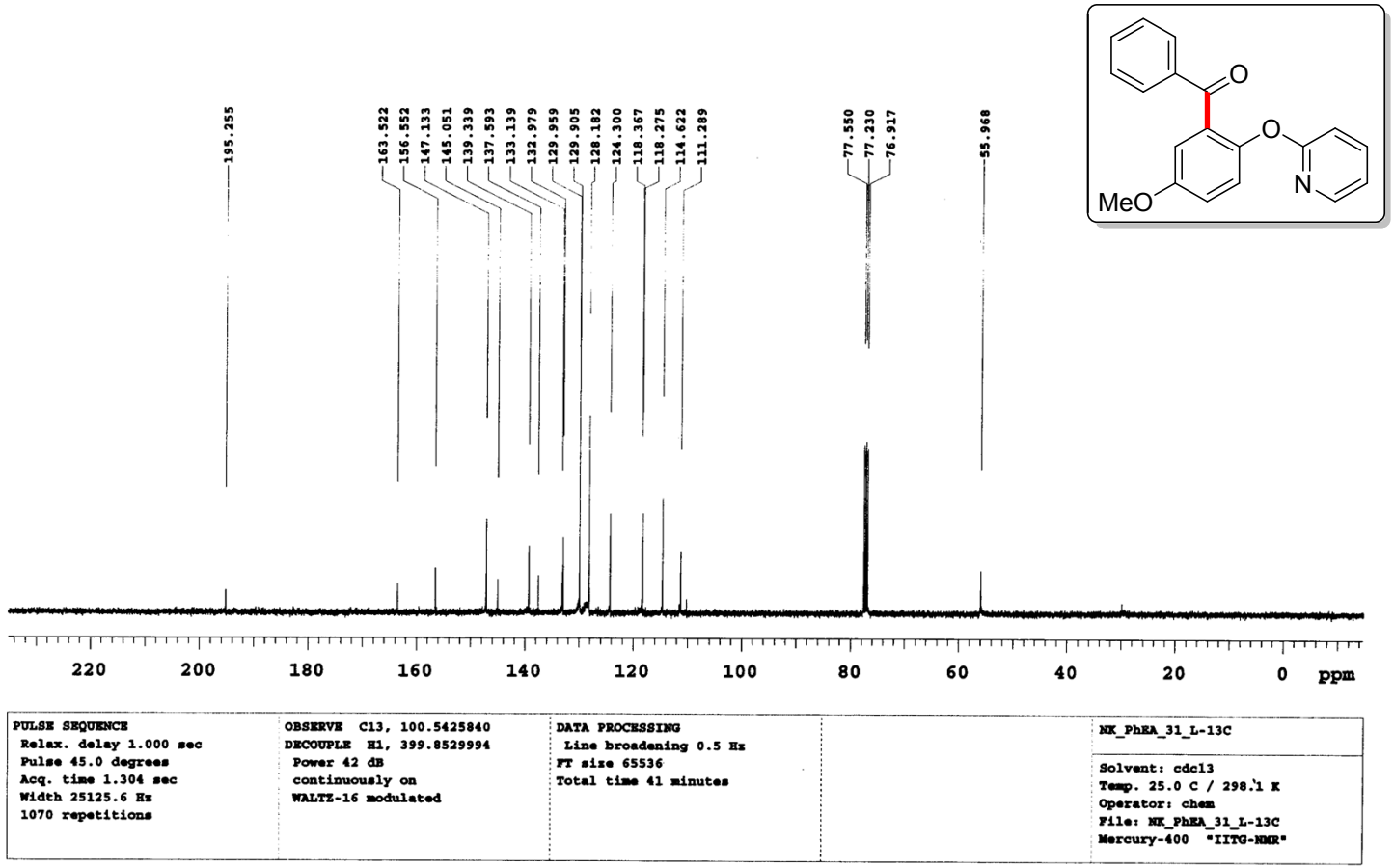
Phenyl(2-(pyridin-2-yloxy)phenyl)methanone (11a): ^{13}C NMR ($CDCl_3$, 100 MHz)



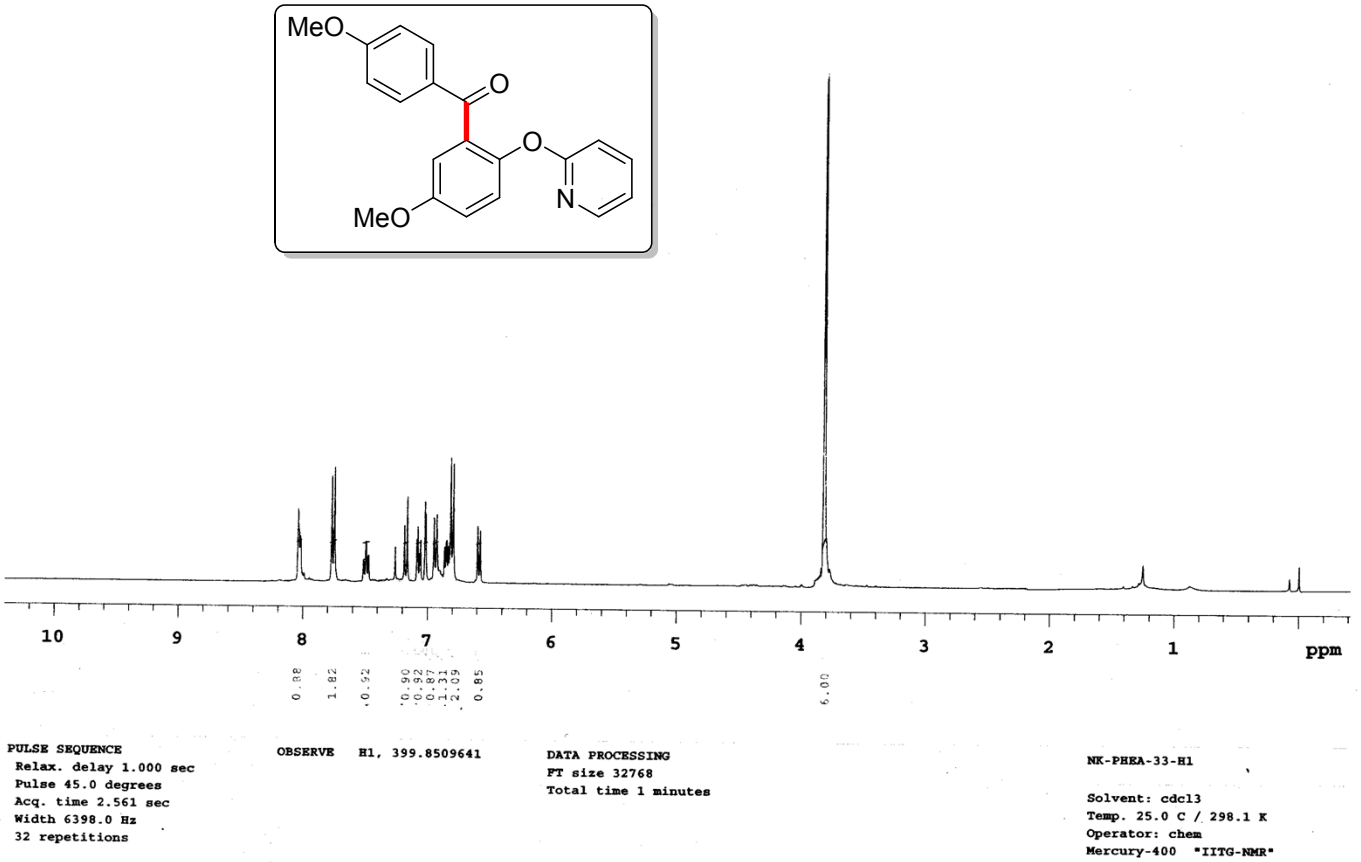
(5-Methoxy-2-(pyridin-2-yloxy)phenyl)(phenyl)methanone (12a): **^{1}H NMR ($CDCl_3$, 400 MHz)**



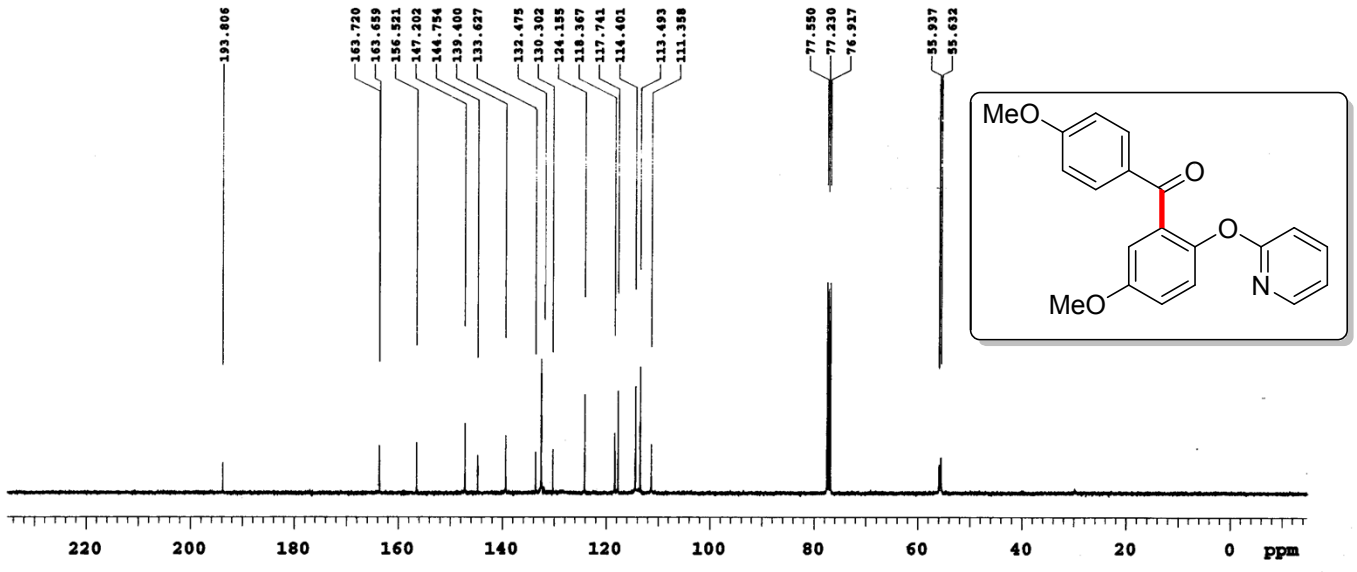
(5-Methoxy-2-(pyridin-2-yloxy)phenyl)(phenyl)methanone (12a): **^{13}C NMR ($CDCl_3$, 100 MHz)**



(5-Methoxy-2-(pyridin-2-yloxy)phenyl)(4-methoxyphenyl)methanone (12c): **^{1}H NMR ($CDCl_3$, 400 MHz)**

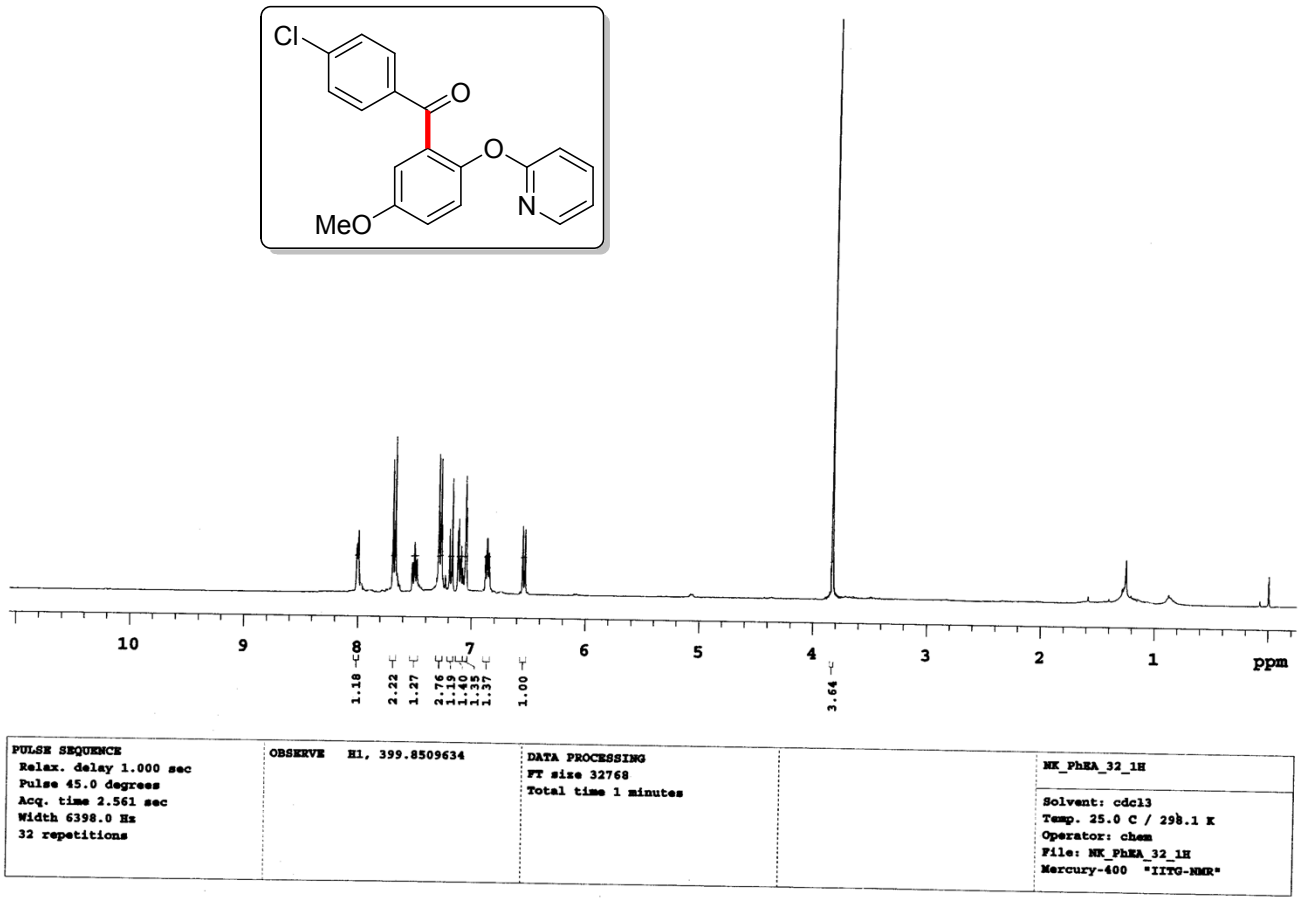


(5-Methoxy-2-(pyridin-2-yloxy)phenyl)(4-methoxyphenyl)methanone (12c): ^{13}C NMR ($CDCl_3$, 100 MHz)

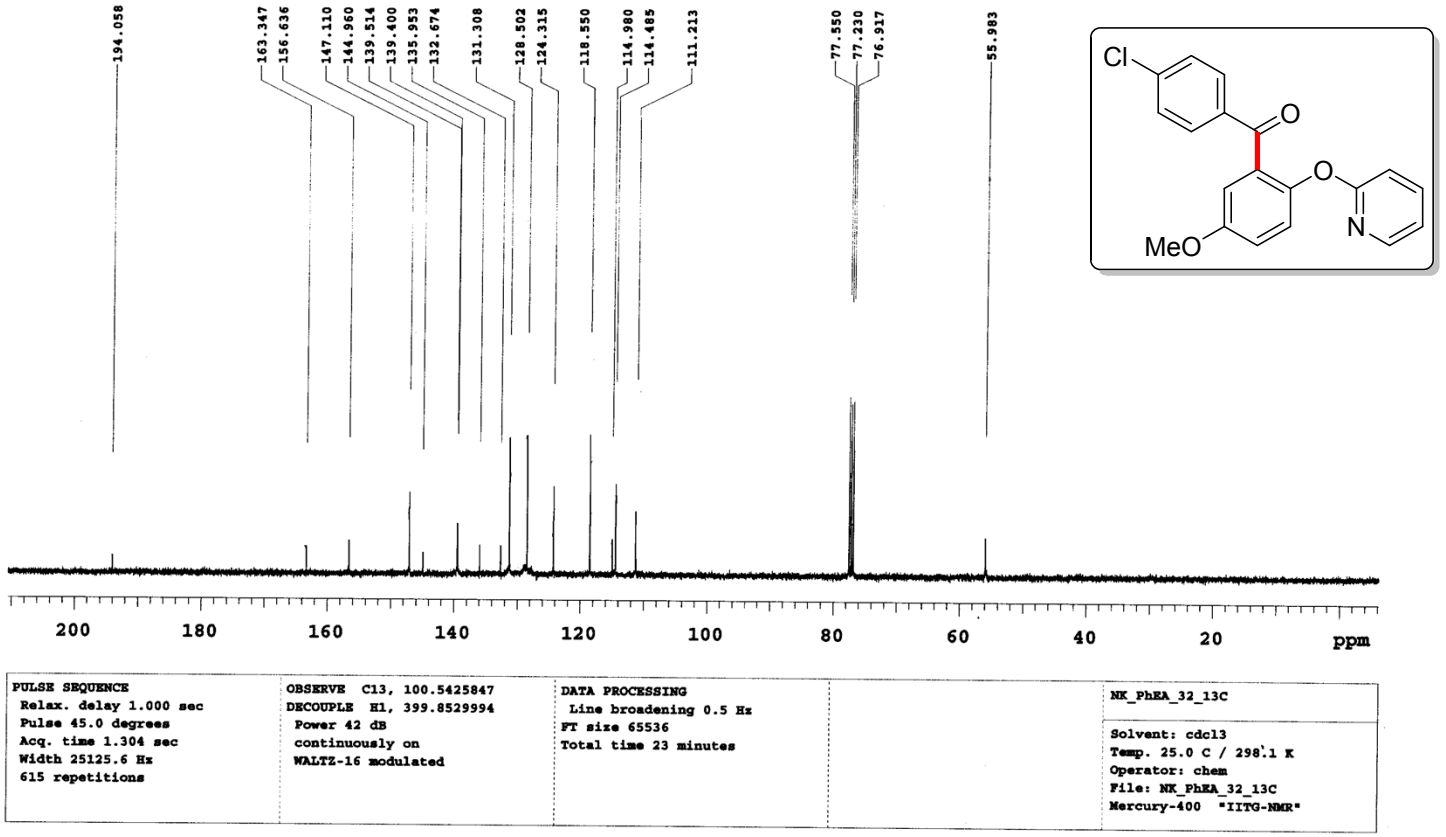


PULSE SEQUENCE Relax. delay 1.000 sec Pulse 45.0 degrees Acq. time 1.304 sec Width 25125.6 Hz 2930 repetitions	OBSERVE C13, 100.5425847 DECOUPLE H1, 399.8529994 Power 42 dB continuously on WALTZ-16 modulated	DATA PROCESSING Line broadening 0.5 Hz FT size 65536 Total time 112 minutes		MK-PhEA-33-13C Solvent: cdcl3 Temp. 25.0 C / 298.1 K Operator: chem File: MK-PhEA-33-13C Mercury-400 "IITG-NMR"

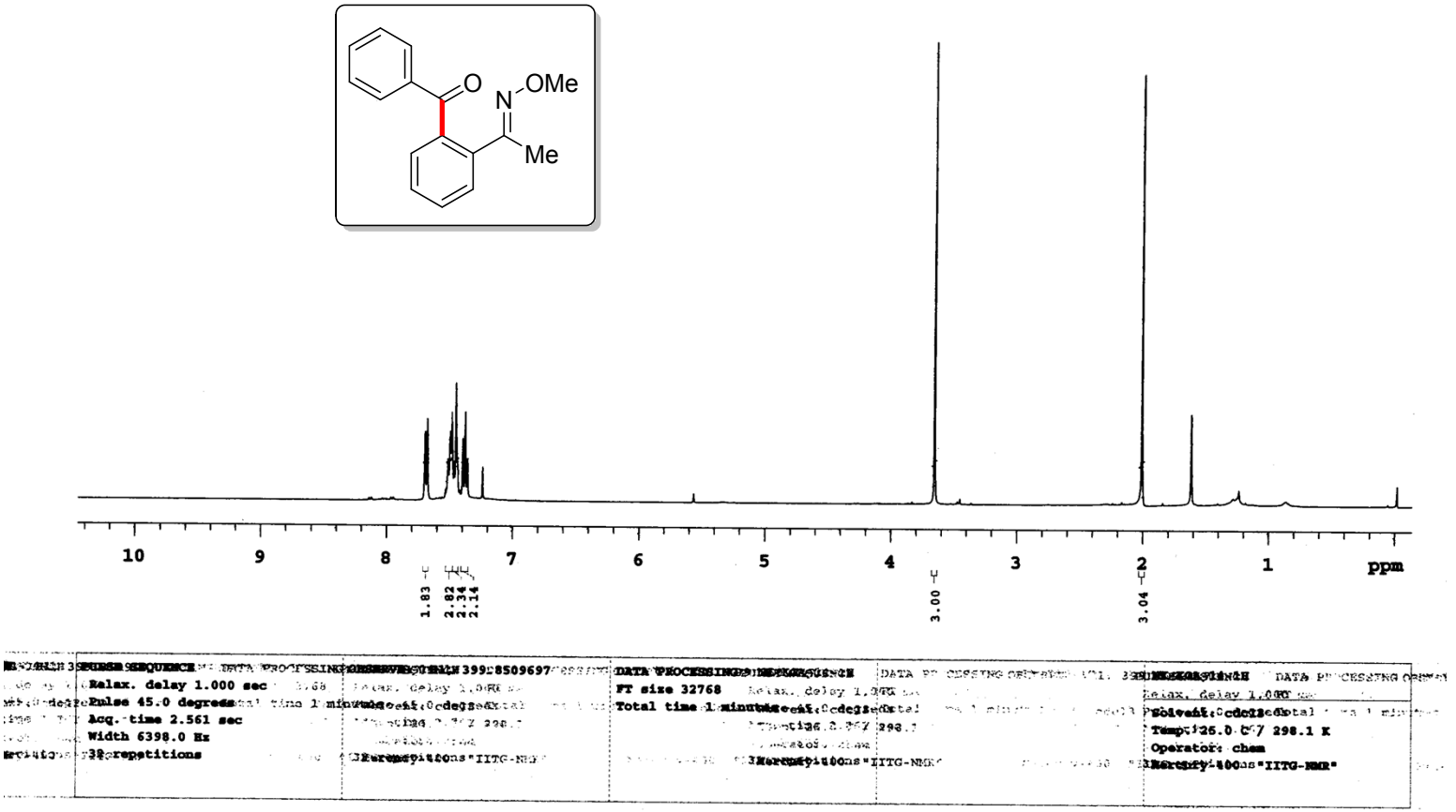
(4-Chlorophenyl)(5-methoxy-2-(pyridin-2-yloxy)phenyl)methanone (12d): **^{1}H NMR ($CDCl_3$, 400 MHz)**



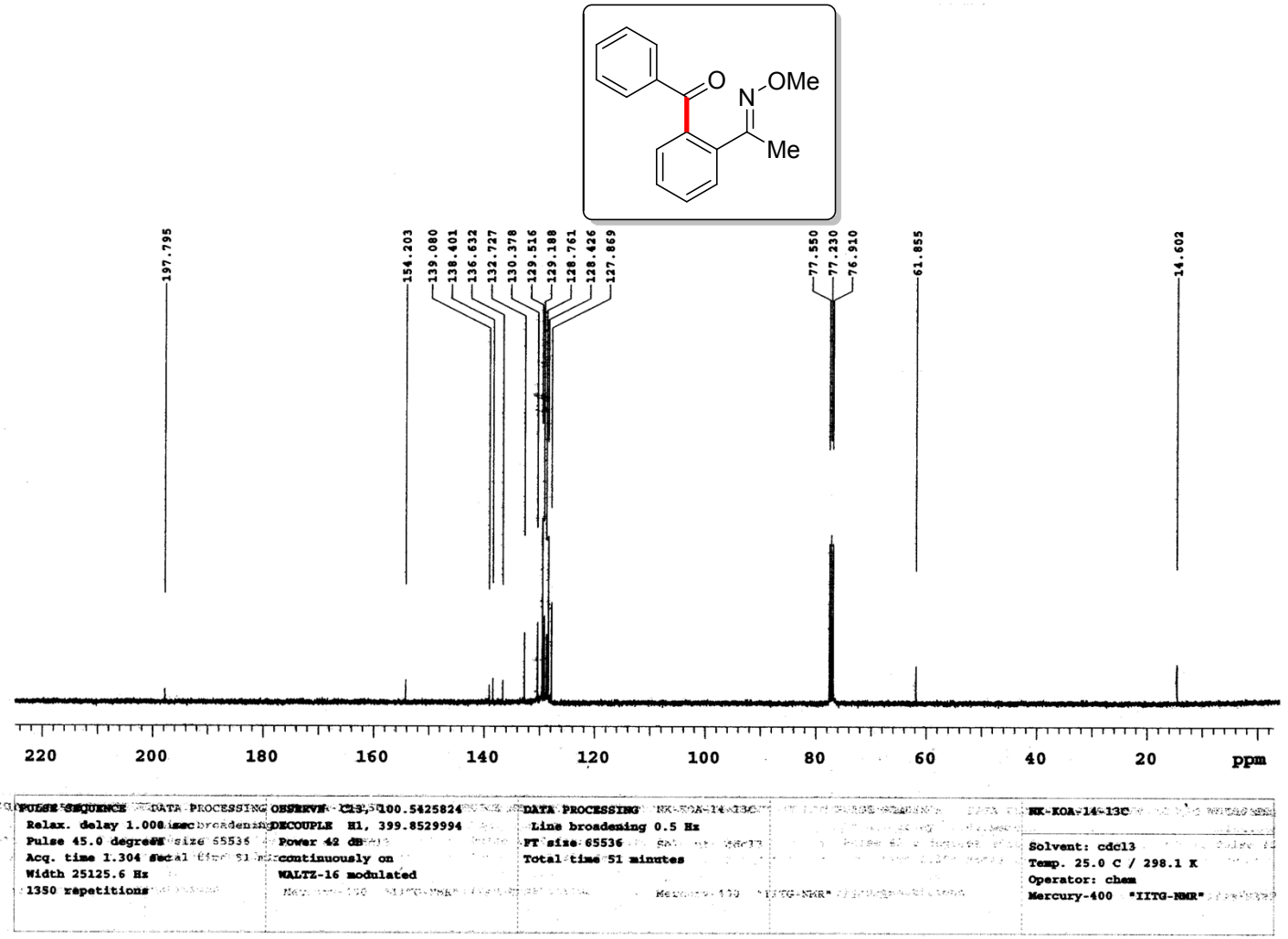
(4-Chlorophenyl)(5-methoxy-2-(pyridin-2-yloxy)phenyl)methanone (12d): ^{13}C NMR ($CDCl_3$, 100 MHz)



(E)-(2-(1-(Methoxyimino)ethyl)phenyl)(phenyl)methanone (13a): **^{1}H NMR ($CDCl_3$, 400 MHz)**



(E)-(2-(1-(Methoxyimino)ethyl)phenyl)(phenyl)methanone (13a): **^{13}C NMR ($CDCl_3$, 100 MHz)**



Analysis of reaction aliquot: HRMS Spectra