Supporting information
For

Decarboxylation of Aromatic Carboxylic Acids by Gold(I)-N-heterocyclic carbene (NHC) Complexes

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General considerations: All reactions were carried out in air. All reagents and solvents were used as purchased. NMR spectra were recorded on Varian Gemini spectrometer and reported in ppm: ^{1}H NMR spectra were recorded at 400 MHz and are referenced to TMS, ^{13}C NMR spectra were recorded at 100 MHz, ^{19}F NMR spectra were recorded at 376.5 MHz. Elemental ananlysis were performed at London Metropolitan University Service.
Complex [Au(IPr)(OH)] was prepared according to literature procedures.[1]

Solution Calorimetry measurements for reaction between 1 and 2a: The mixing vessels of the Setaram C-80 were cleaned, dried in an oven maintained at 120 ^{o}C, and then taken into the glovebox. A 15-20 mg sample of **1** was weighed out accurately into the inner vessel. Four milliliters of a solution of the carboxylic acid (3 fold excess) was added to the outer cell compartment. The remainder of a cell was assembled, removed from the glovebox and inserted in the calorimeter. The reference vessel was loaded in an identical fashion with the exception that no organometallic complex was added to the inner vessel. After the calorimeter has reached thermal equilibrium at 30 ^{o}C (approximately 3 h), the calorimeter was inverted, thereby allowing the reactants to mix. After the reaction had reached completion and the calorimeter had once again reached thermal equilibrium (approximately 3 h), the

vessels were removed from the calorimeter, taken into the glovebox, opened, and analyzed using ^{1}HNMR spectroscopy. The enthalpy of reaction (-9.4(5)) represents the average of 3-5 individual calorimetric determinations with all species in solution.

General procedure for stoichiometric decarboxylation: A scintillation vial was charged with [(IPr)AuOH] (20 mg, 0.033 mmol) and the carboxylic acid (0.033 mmol) in toluene (0.4 mL). The reaction mixture was stirred at 110°C and monitored by ^{1}H NMR. Upon completion, the product mixture was concentrated under reduced pressure to afford the clean desired product without further purification.

Figure S1.

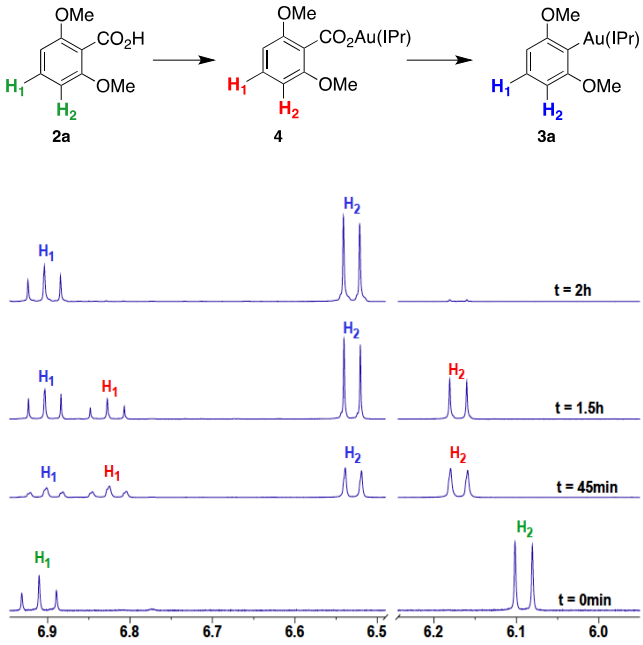
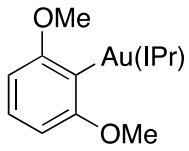


Figure S1. ^{1}H NMR experiments following the evolution of **2a** to **4** to **3a**.

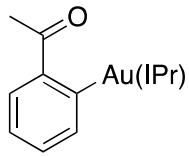
Product Characterization data:

[*N*,*N*-Bis(2,6-diisopropylphenyl)imidazol-2-yl](2,6-dimethoxyphenyl)gold(I) (3a)



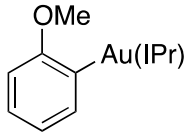
^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.48 (t, 2H, *J* = 8 Hz), 7.29 (d, 4H, *J* = 7.6 Hz), 7.17 (s, 2H), 6.81 (t, 1H, *J* = 7.8 Hz), 6.42 (d, 2H, *J* = 8 Hz), 3.30 (s, 6H), 2.69 (sept, 1H, *J* = 6.8 Hz), 1.39 (d, 12H, *J* = 6.8 Hz), 1.24 (d, 12H, *J* = 6.8 Hz).
^{13}C NMR ($CDCl_3$, 100 MHz): δ 196.5, 168.1, 146.1, 143.9, 135, 130.1, 126.1, 124, 122.7, 107.6, 56.9, 29, 24.4, 24.2.
Anal. Calcd for $C_{35}H_{45}AuN_2O_2$: C, 58.17; H, 6.27; N, 3.88. Found: C, 58.17; H, 6.35; N, 3.72.

[*N*,*N*-Bis(2,6-diisopropylphenyl)imidazol-2-yl](2-acetylphenyl)gold(I) (3b)



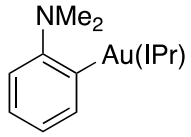
^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.70-7.68 (m, 1H), 7.50 (t, 2H, *J* = 8 Hz), 7.30 (d, 4H, *J* = 7.6 Hz), 7.28-7.25 (m, 2H), 7.21 (s, 2H), 6.81 (t, 1H, *J* = 7.8 Hz), 7.17-7.14 (m, 1H), 2.57 (sept, 1H, *J* = 6.8 Hz), 2.13 (s, 3H), 1.39 (d, 12H, *J* = 6.8 Hz), 1.23 (d, 12H, *J* = 6.8 Hz).
^{13}C NMR ($CDCl_3$, 100 MHz): δ 205.1, 171.2, 168.2, 145.8, 142.8, 135.7, 134.1, 130.8, 129.8, 129.4, 125.9, 124.4, 123.3, 30.3, 29.0, 24.5, 24.2.
Anal. Calcd for $C_{35}H_{43}AuN_2O$: C, 59.65; H, 6.15; N, 3.98. Found: C, 59.54; H, 6.20; N, 3.89.

[*N*,*N*-Bis(2,6-diisopropylphenyl)imidazol-2-yl](2-methoxyphenyl)gold(I) (3c)



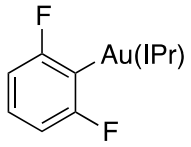
^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.47 (t, 2H, *J* = 8 Hz), 7.28 (d, 4H, *J* = 7.6 Hz), 7.16 (s, 2H), 6.85 (td, 1H, *J* = 7.6, 1.6 Hz), 7.02 (dd, 1H, *J* = 7, 1.8 Hz), 6.66-6.72 (m, 2H), 3.38 (s, 3H), 2.68 (sept, 1H, *J* = 6.8 Hz), 1.40 (d, 12H, *J* = 6.8 Hz), 1.24 (d, 12H, *J* = 6.8 Hz).
^{13}C NMR ($CDCl_3$, 100 MHz): δ 196.7, 166.7, 157.0, 145.9, 141.1, 134.8, 130.2, 125.3, 124.0, 122.8, 120.6, 113.2, 56.9, 28.9, 24.5, 24.1.
Anal. Calcd for $C_{34}H_{43}AuN_2O$: C, 58.95; H, 6.26; N, 4.04. Found: C, 59.02; H, 6.17; N, 3.92.

[*N*,*N*-Bis(2,6-diisopropylphenyl)imidazol-2-yl](2-dimethylaminophenyl)gold(I) (3d)



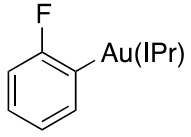
^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.49 (t, 2H, *J* = 7.8 Hz), 7.30 (d, 4H, *J* = 8 Hz), 7.17 (s, 2H), 7.00 (dd, 1H, *J* = 6.8, 1.6 Hz), 6.82 (m, 1H), 6.71 (dd, 1H, *J* = 8, 1.2 Hz), 6.59 (td, 1H, *J* = 7.2, 1.2 Hz), 2.70 (sept, 1H, *J* = 6.8 Hz), 2.49 (s, 6H), 1.38 (d, 12H, *J* = 6.8 Hz), 1.23 (d, 12H, *J* = 6.8 Hz).
^{13}C NMR ($CDCl_3$, 100 MHz): δ 196.8, 162.3, 161.5, 145.9, 141.0, 135.0, 130.2, 124.9, 124.0, 122.8, 119.7, 117.0, 45.2, 28.9, 24.4, 24.3.
Anal. Calcd for $C_{35}H_{46}AuN_3$: C, 59.57; H, 6.57; N, 5.95. Found: C, 59.70; H, 6.20; N, 5.88.

[*N*,*N*-Bis(2,6-diisopropylphenyl)imidazol-2-yl](2,6-difluorophenyl)gold(I) (3e)



^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.48 (t, 2H, *J* = 8 Hz), 7.29 (d, 4H, *J* = 7.6 Hz), 7.18 (s, 2H), 6.80 (q_t, 1H, *J* = 8 Hz), 6.59 (d, 1H, *J* = 5.6 Hz), 6.57 (d, 1H, *J* = 5.6 Hz), 2.66 (sept, 1H, *J* = 6.8 Hz), 1.40 (d, 12H, *J* = 6.8 Hz), 1.23 (d, 12H, *J* = 6.8 Hz).
^{13}C NMR ($CDCl_3$, 100 MHz): δ 194.3, 170.4 (d, *J* = 24.8 Hz), 168.2 (d, *J* = 24.5 Hz), 145.9, 143.9, 134.5, 130.4, 126.3 (t, *J* = 8.3 Hz), 124.1, 122.9, 109.0 (dd, *J* = 30.7 Hz, *J* = 3 Hz), 29, 24.5, 24.2.
^{19}F NMR ($CDCl_3$, 376 MHz): δ -87.66 (t, 2F, *J* = 6.2 Hz)
Anal. Calcd for $C_{33}H_{39}AuF_2N_2$: C, 56.73; H, 5.63; N, 4.01. Found: C, 59.68; H, 5.51; N, 3.99.

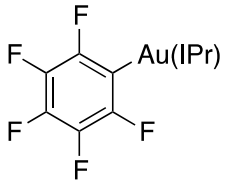
[*N*,*N*-Bis(2,6-diisopropylphenyl)imidazol-2-yl](2-fluorophenyl)gold(I) (3f)



^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.47 (t, 2H, *J* = 8 Hz), 7.28 (d, 4H, *J* = 7.6 Hz), 7.16 (s, 2H), 7.08-7.05 (m, 1H), 6.89-6.81 (m, 2H), 6.76-6.73 (m, 1H), 2.67 (sept, 1H, *J* = 6.8 Hz), 1.41 (d, 12H, *J* = 6.8 Hz), 1.25 (d, 12H, *J* = 6.8 Hz).
^{13}C NMR ($CDCl_3$, 100 MHz): δ 195.7, 170.4, 167.3, 152.8, 152.1, 145.9, 141.3, 141.1, 134.6, 130.3, 125.5 (d, *J* = 38 Hz), 124.1, 122.9, 122.7, 113.3, 112.9, 29.0, 24.6, 24.1.
^{19}F NMR ($CDCl_3$, 376 MHz): δ -89.75 (s, 1F)
Anal. Calcd for $C_{33}H_{40}AuN_2F$: C, 58.23; H, 5.92; N, 4.12. Found: C, 58.35; H, 6.03;

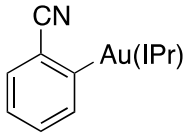
N, 3.99.

[*N*,*N*-Bis(2,6-diisopropylphenyl)imidazol-2-yl](2,3,4,5,6-pentafluorophenyl)gold(I) (3g)



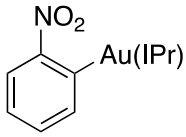
^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.49 (t, 2H, *J* = 7.8 Hz), 7.29 (d, 4H, *J* = 8 Hz), 7.20 (s, 2H), 2.62 (sept, 1H, *J* = 6.8 Hz), 1.36 (d, 12H, *J* = 6.8 Hz), 1.24 (d, 12H, *J* = 6.8 Hz).
^{13}C NMR ($CDCl_3$, 100 MHz): δ 192.1, 145.9, 134.2, 130.6, 129.2, 128.7, 128.4, 124.2, 123.1, 122.8, 119.7, 117.0, 45.2, 29.0, 24.5, 24.2.
^{19}F NMR ($CDCl_3$, 376 MHz): δ -164.4 (t, 2F, *J* = 27.1 Hz), -161.7 (t, 1F, *J* = 26.3 Hz), -116.6 (d, 2F, *J* = 27.1 Hz)
Anal. Calcd for $C_{33}H_{36}AuF_5N_2$: C, 52.66; H, 4.82; N, 3.72. Found: C, 52.70; H, 4.60; N, 3.62.

[*N*,*N*-Bis(2,6-diisopropylphenyl)imidazol-2-yl](2-cyanophenyl)gold(I) (3h)



^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.53-7.47 (m, 4H), 7.42-7.39 (m, 4H), 7.30 (d, 4H, *J* = 7.6 Hz), 7.22 (s, 2H), 2.61 (sept, 1H, *J* = 6.8 Hz), 1.44 (d, 12H, *J* = 6.8 Hz), 1.25 (d, 12H, *J* = 6.8 Hz).
^{13}C NMR ($CDCl_3$, 100 MHz): δ 178.3, 177.4, 145.9, 136.4, 134.1, 131.9, 130.8, 129.2, 124.3, 123.2, 121.5, 29.1, 24.6, 24.2.
Anal. Calcd for $C_{34}H_{40}AuN_3$: C, 59.38; H, 5.86; N, 6.11. Found: C, 59.39; H, 5.72; N, 6.00.

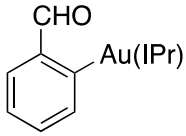
[*N*,*N*-Bis(2,6-diisopropylphenyl)imidazol-2-yl](2-nitrophenyl)gold(I) (3i)



Synthesis from boronic acid: [Au(IPr)(OH)] (20 mg, 0.033 mmol) and 2-nitrophenylboronic acid (5.8 mg, 0.035 mmol) were charged in a vial containing benzene (0.5 mL). The reaction was stirred at room temperature overnight. The solution was filtered through Celite®, the solvent was removed from the filtrate under vacuum and pentane (6 mL) was added. The resulting precipitate was collected on a frit, washed with pentane (3 x 3 mL) and dried under vacuum to afford **2i** as a microcrystalline white solid (16.9 mg, 74%).

^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.73 (d, 1H, *J* = 8 Hz), 7.49 (t, 2H, *J* = 8 Hz), 7.30 (d, 1H, *J* = 8 Hz), 7.18-7.16 (m, 4H), 6.96-6.91 (m, 1H), 2.67 (sept, 1H, *J* = 6.8 Hz), 1.39 (d, 12H, *J* = 6.8 Hz), 1.24 (d, 12H, *J* = 6.8 Hz).
^{13}C NMR ($CDCl_3$, 100 MHz): δ 193.2, 164.6, 158.8, 145.9, 141.7, 134.6, 130.9, 130.4, 129.2, 128.4, 125.4, 124.3, 124.1, 123.0, 122.9, 29.0, 24.5, 24.2.
Anal. Calcd for $C_{33}H_{40}AuN_3O_2$: C, 56.01; H, 5.70; N, 5.94. Found: C, 56.14; H, 5.83; N, 5.81.

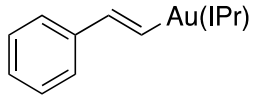
[*N*,*N*-Bis(2,6-diisopropylphenyl)imidazol-2-yl](2-formylphenyl)gold(I) (3j)



Synthesis from boronic acid: [Au(IPr)(OH)] (20 mg, 0.033 mmol) and (2-formylphenyl)boronic acid (5.2 mg, 0.035 mmol) were charged in a vial containing benzene (0.5 mL). The reaction was stirred at room temperature overnight. The solution was filtered through Celite®, the solvent was removed from the filtrate under vacuum and pentane (6 mL) was added. The resulting precipitate was collected on a frit, washed with pentane (3 x 3 mL) and dried under vacuum to afford **2j** as a microcrystalline white solid (16.2 mg, 71%).

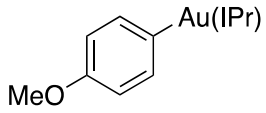
^{1}H NMR ($CDCl_3$, 400 MHz): δ 9.63 (sd, 1H, *J* = 0.8 Hz), 7.75 (d, 1H, *J* = 7.6 Hz), 7.53 (t, 2H, *J* = 7.8 Hz), 7.32 (d, 4H, *J* = 8 Hz), 7.25 (d, 1H, *J* = 7.2 Hz), 7.21 (s, 2H), 7.18 (td, 1H, *J* = 7.2, 1.6 Hz), 6.98 (t, 1H, *J* = 7.8 Hz), 2.67 (sept, 1H, *J* = 6.8 Hz), 1.36 (d, 12H, *J* = 6.8 Hz), 1.25 (d, 12H, *J* = 6.8 Hz).
^{13}C NMR ($CDCl_3$, 100 MHz): δ 199.5, 196.5, 180.0, 146.0, 145.9, 141.2, 134.5, 131.1, 130.6, 126.1, 124.4, 124.2, 123.1, 29.0, 24.5, 24.2.
Anal. Calcd for $C_{34}H_{41}AuN_2O$: C, 59.13; H, 5.98; N, 4.06. Found: C, 59.22; H, 5.93; N, 3.93.

[*N*,*N*-Bis(2,6-diisopropylphenyl)imidazol-2-yl]((*E*)-styryl)gold(I) (3k)



^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.49 (t, 2H, *J* = 8 Hz), 7.40 (d, 1H, *J* = 19.6 Hz), 7.30 (d, 4H, *J* = 7.6 Hz), 7.20-7.18 (d, 2H, *J* = 8.4 Hz), 7.13-7.09 (m, 4H), 6.95 (tdt, 1H, *J* = 7.2 Hz), 6.32 (d, 1H, *J* = 19.2 Hz), 2.66 (sept, 1H, *J* = 6.8 Hz), 1.40 (d, 12H, *J* = 6.8 Hz), 1.23 (d, 12H, *J* = 6.8 Hz).
^{13}C NMR ($CDCl_3$, 100 MHz): δ 197.9, 158.6, 145.9, 143.1, 141.2, 134.8, 130.3, 128.0, 125.3, 125.1, 124.1, 122.9, 28.9, 24.6, 24.1.
Anal. Calcd for $C_{35}H_{43}AuN_2$: C, 61.04; H, 6.29; N, 4.07. Found: C, 61.15; H, 6.39; N, 3.88.

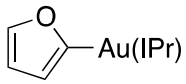
[*N*,*N*-Bis(2,6-diisopropylphenyl)imidazol-2-yl](4-methoxyphenyl)gold(I) (3l)



Synthesis from boronic acid: [Au(IPr)(OH)] (20 mg, 0.033 mmol) and (4-methoxybenzene)boronic acid (5.3 mg, 0.035 mmol) were charged in a vial containing benzene (0.5 mL). The reaction was stirred at room temperature overnight. The solution was filtered through Celite®, the solvent was removed from the filtrate under vacuum and pentane (6 mL) was added. The resulting precipitate was collected on a frit, washed with pentane (3 x 3 mL) and dried under vacuum to afford **2j** as a microcrystalline white solid (19.6 mg, 86%).

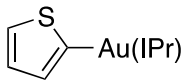
^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.95 (d, 2H, *J* = 9 Hz), 7.61 (t, 2H, *J* = 8 Hz), 7.41 (d, 1H, *J* = 8 Hz), 7.29 (s, 2H), 6.83 (d, 2H, *J* = 8.8 Hz), 3.86 (s, 3H), 2.71 (sept, 1H, *J* = 6.8 Hz), 1.52 (d, 12H, *J* = 6.8 Hz), 1.34 (d, 12H, *J* = 6.8 Hz).
^{13}C NMR ($CDCl_3$, 100 MHz): δ 197.1, 160.6, 145.9, 140.8, 134.8, 130.2, 122.8, 117.3, 112.8, 55.1, 28.9, 24.7, 24.1.
Anal. Calcd for $C_{34}H_{43}AuN_2O$: C, 58.95; H, 6.26; N, 4.04. Found: C, 59.14; H, 6.15; N, 3.97.

[*N*,*N*-Bis(2,6-diisopropylphenyl)imidazol-2-yl](furan-2-yl)gold(I) (3m)



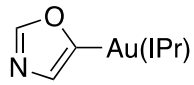
^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.50 (dd, 1H, *J* = 1.8, 0.6 Hz), 7.47 (t, 2H, *J* = 8 Hz), 7.28 (d, 1H, *J* = 7.6 Hz), 7.15 (s, 2H), 6.24 (dd, 1H, *J* = 3.0, 1.8 Hz), 5.81 (dd, 1H, *J* = 3.0, 0.6 Hz), 2.65 (sept, 1H, *J* = 6.8 Hz), 1.39 (d, 12H, *J* = 6.8 Hz), 1.23 (d, 12H, *J* = 6.8 Hz).
^{13}C NMR ($CDCl_3$, 100 MHz): δ 194.6, 192.3, 145.8, 143.9, 141.2, 134.5, 130.4, 124.1, 123.1, 117.9, 107.7, 28.9, 24.7, 24.1.
Anal. Calcd for $C_{31}H_{39}AuN_2O$: C, 57.05; H, 6.02; N, 4.29. Found: C, 57.13; H, 5.95; N, 4.20.

[*N*,*N*-Bis(2,6-diisopropylphenyl)imidazol-2-yl](thiophen-2-yl)gold(I) (3n)



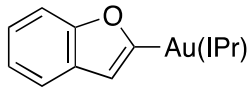
^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.47 (t, 2H, *J* = 8 Hz), 7.37 (dd, 1H, *J* = 4.6, 0.6 Hz), 7.28 (d, 1H, *J* = 7.6 Hz), 7.18-7.15 (m, 4H), 6.66 (dd, 1H, *J* = 3.2, 0.8 Hz), 2.66 (sept, 1H, *J* = 6.8 Hz), 1.40 (d, 12H, *J* = 6.8 Hz), 1.24 (d, 12H, *J* = 6.8 Hz).
^{13}C NMR ($CDCl_3$, 100 MHz): δ 194.3, 165.8, 145.8, 134.5, 132.3, 130.4, 126.7, 126.1, 124.1, 123.0, 28.9, 24.6, 24.1.
Anal. Calcd for $C_{31}H_{39}AuN_2S$: C, 55.68; H, 5.88; N, 4.19. Found: C, 55.76; H, 5.80; N, 4.13.

[*N*,*N*-Bis(2,6-diisopropylphenyl)imidazol-2-yl](oxazol-2-yl)gold(I) (3o)



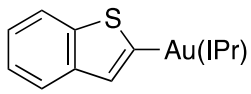
^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.88 (s, 1H), 7.49 (t, 2H, *J* = 8 Hz), 7.29 (d, 1H, *J* = 7.6 Hz), 7.17 (s, 2H), 6.41 (s, 1H), 2.62 (sept, 1H, *J* = 6.8 Hz), 1.36 (d, 12H, *J* = 6.8 Hz), 1.23 (d, 12H, *J* = 6.8 Hz).
^{13}C NMR ($CDCl_3$, 100 MHz): δ 152.9, 145.8, 145.8, 134.3, 133.5, 129.2, 128.4, 124.2, 123.3, 28.9, 24.6, 24.1.
Anal. Calcd for $C_{30}H_{38}AuN_3O$: C, 55.13; H, 5.86; N, 6.43. Found: C, 55.19; H, 5.59; N, 6.38

[*N*,*N*-Bis(2,6-diisopropylphenyl)imidazol-2-yl](benzofuran-2-yl)gold(I) (3p)



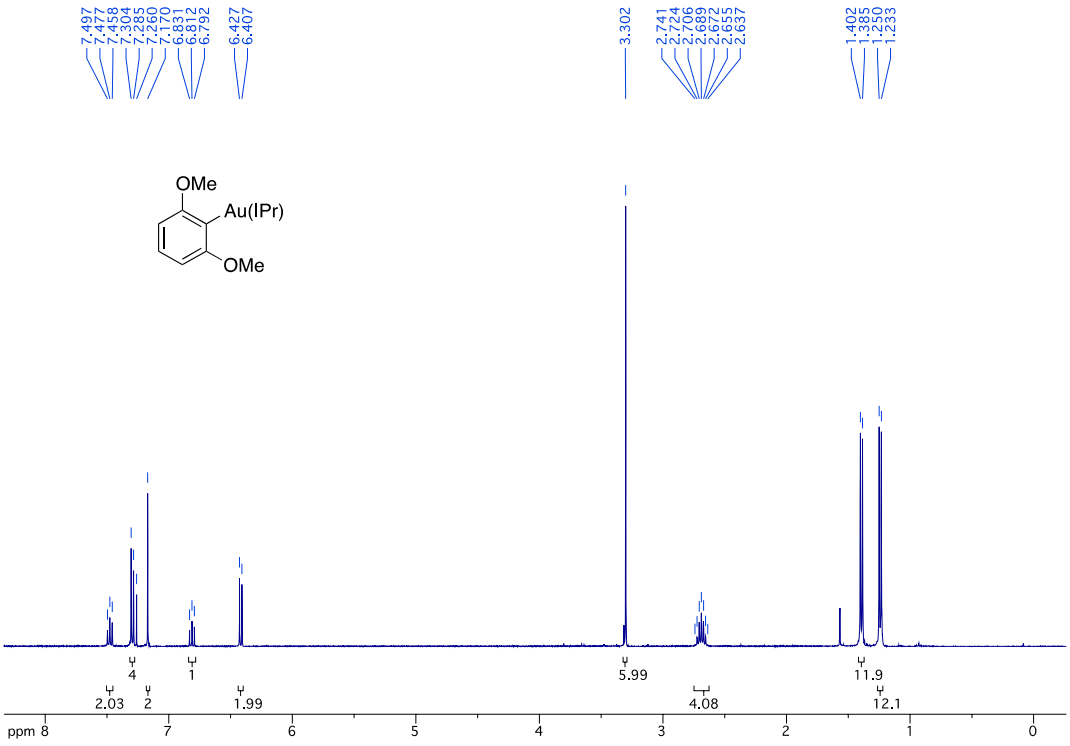
^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.50 (dd, 1H, *J* = 1.8, 0.6 Hz), 7.47 (t, 2H, *J* = 8 Hz), 7.28 (d, 1H, *J* = 7.6 Hz), 7.15 (s, 2H), 6.24 (dd, 1H, *J* = 3.0, 1.8 Hz), 5.81 (dd, 1H, *J* = 3.0, 0.6 Hz), 2.65 (sept, 1H, *J* = 6.8 Hz), 1.39 (d, 12H, *J* = 6.8 Hz), 1.23 (d, 12H, *J* = 6.8 Hz).
^{13}C NMR ($CDCl_3$, 100 MHz): δ 194.6, 192.3, 145.8, 143.9, 141.2, 134.5, 130.4, 124.1, 123.1, 117.9, 107.7, 28.9, 24.7, 24.1.
Anal. Calcd for $C_{35}H_{41}AuN_2O$: C, 59.82; H, 5.88; N, 3.99. Found: C, 59.93; H, 5.75; N, 3.97.

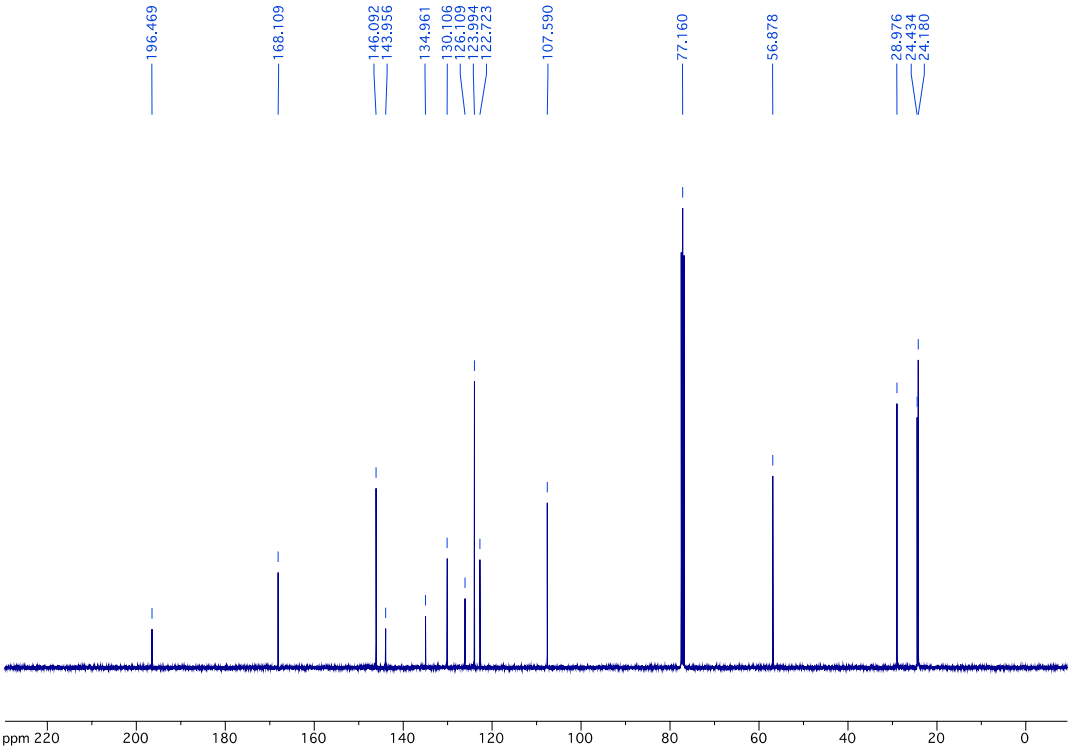
[*N*,*N*-Bis(2,6-diisopropylphenyl)imidazol-2-yl](benzothiophen-2-yl)gold(I) (3q)

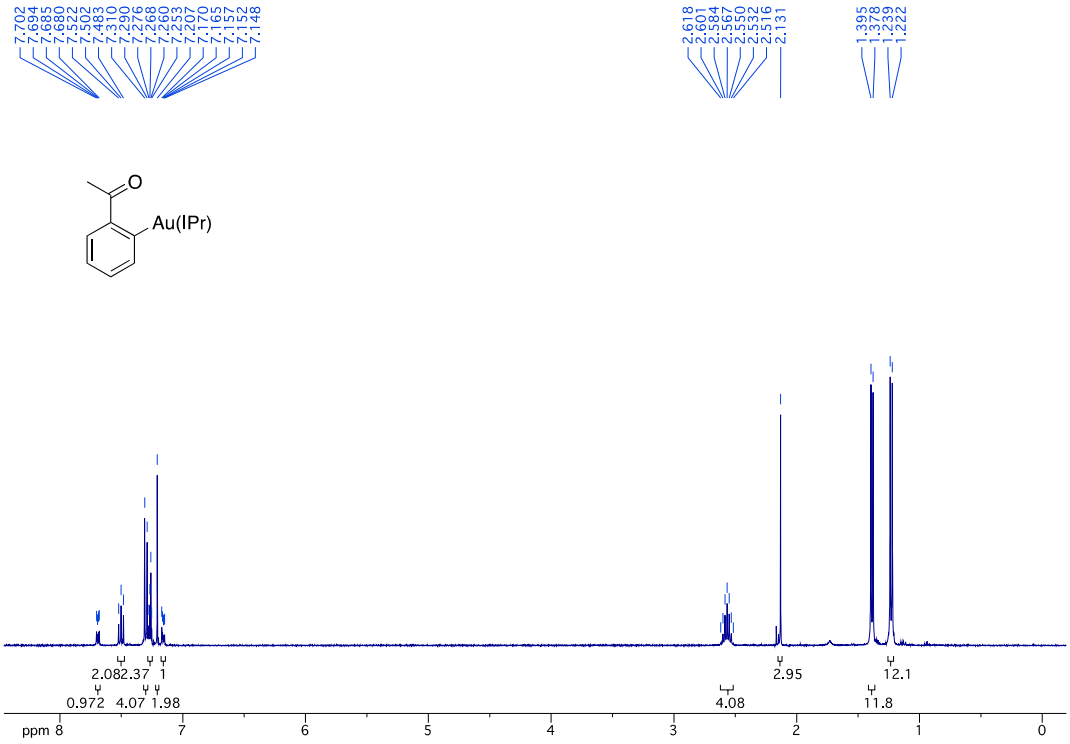


^{1}H NMR ($CDCl_3$, 400 MHz): δ 7.50 (dd, 1H, *J* = 1.8, 0.6 Hz), 7.47 (t, 2H, *J* = 8 Hz), 7.28 (d, 1H, *J* = 7.6 Hz), 7.15 (s, 2H), 6.24 (dd, 1H, *J* = 3.0, 1.8 Hz), 5.81 (dd, 1H, *J* = 3.0, 0.6 Hz), 2.65 (sept, 1H, *J* = 6.8 Hz), 1.39 (d, 12H, *J* = 6.8 Hz), 1.23 (d, 12H, *J* = 6.8 Hz).
^{13}C NMR ($CDCl_3$, 100 MHz): δ 194.1, 168.8, 145.9, 143.4, 141.7, 134.4, 130.5, 128.9, 124.2 123.1, 122.5, 121.7, 121.5, 121.1, 29.0, 24.7, 24.1.
Anal. Calcd for $C_{35}H_{41}AuN_2S$: C, 58.49; H, 5.75; N, 3.90. Found: C, 58.59; H, 5.64; N, 3.94.

Spectroscopic data for all organogold complexes:



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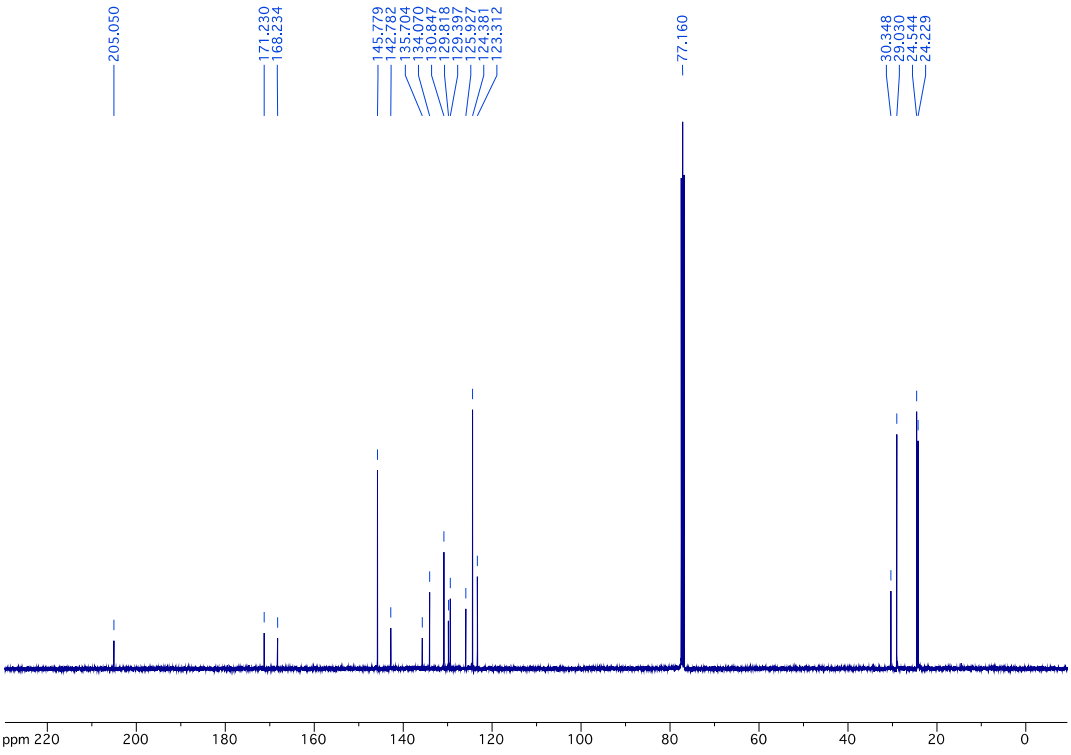
7.685
7.680
7.522
7.502
7.483
7.310
7.290
7.276
7.268
7.260
7.253
7.207
7.170
7.165
7.157
7.152
7.148
2.618
2.601
2.584
2.567
2.550
2.532
2.516
2.131
1.395
1.378
1.239
1.222
O
Au(IPr)
2.08
2.37
1
0.972
4.07
1.98
2.95
12.1
4.08
11.8
ppm 8
7
6
5
4
3
2
1
0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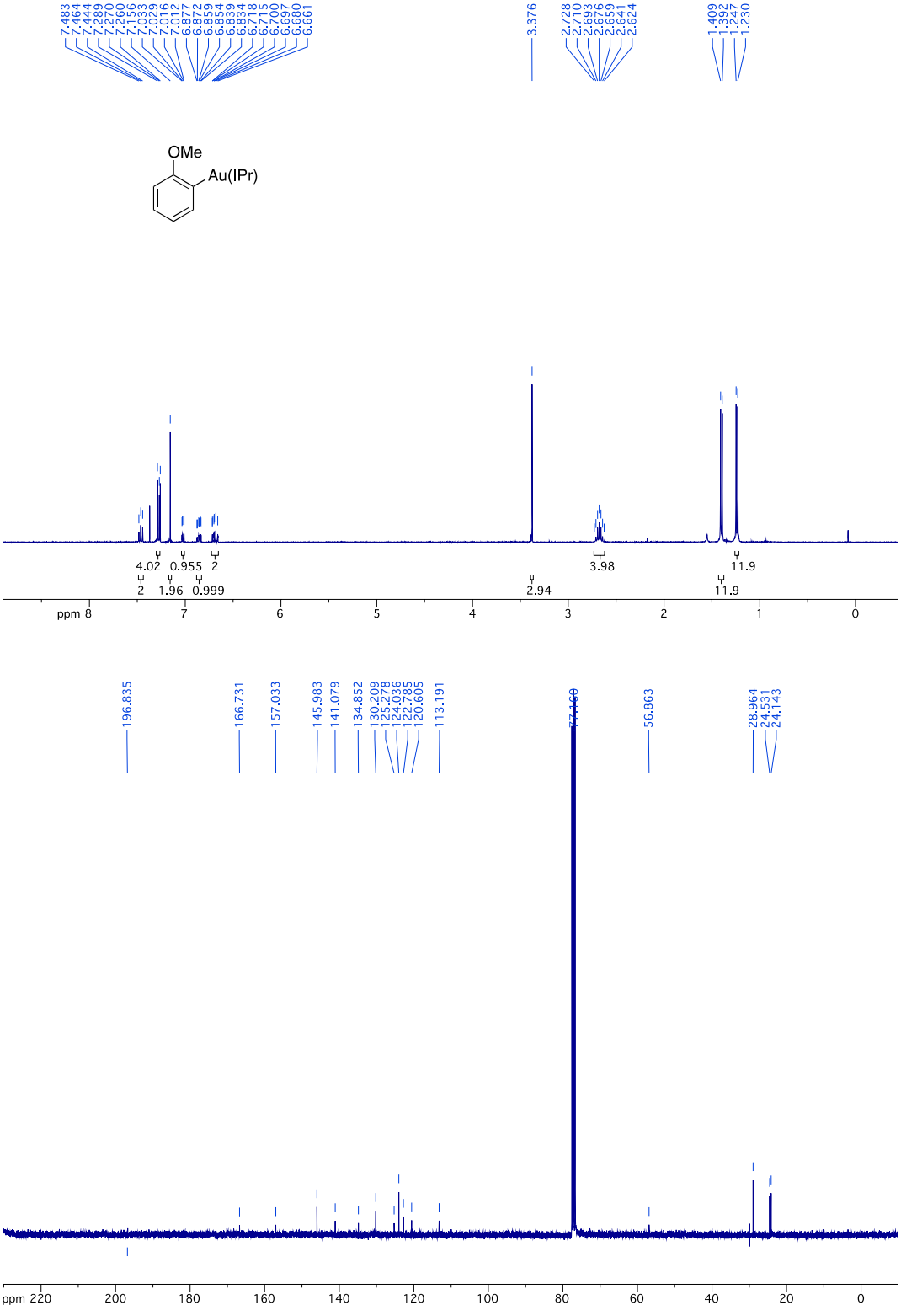
171.230
168.234
145.779
142.782
135.704
134.970
130.847
130.818
129.397
125.927
124.381
123.312
77.160
30.348
29.030
24.544
24.229
ppm 220
200
180
160
140
120
100
80
60
40
20
0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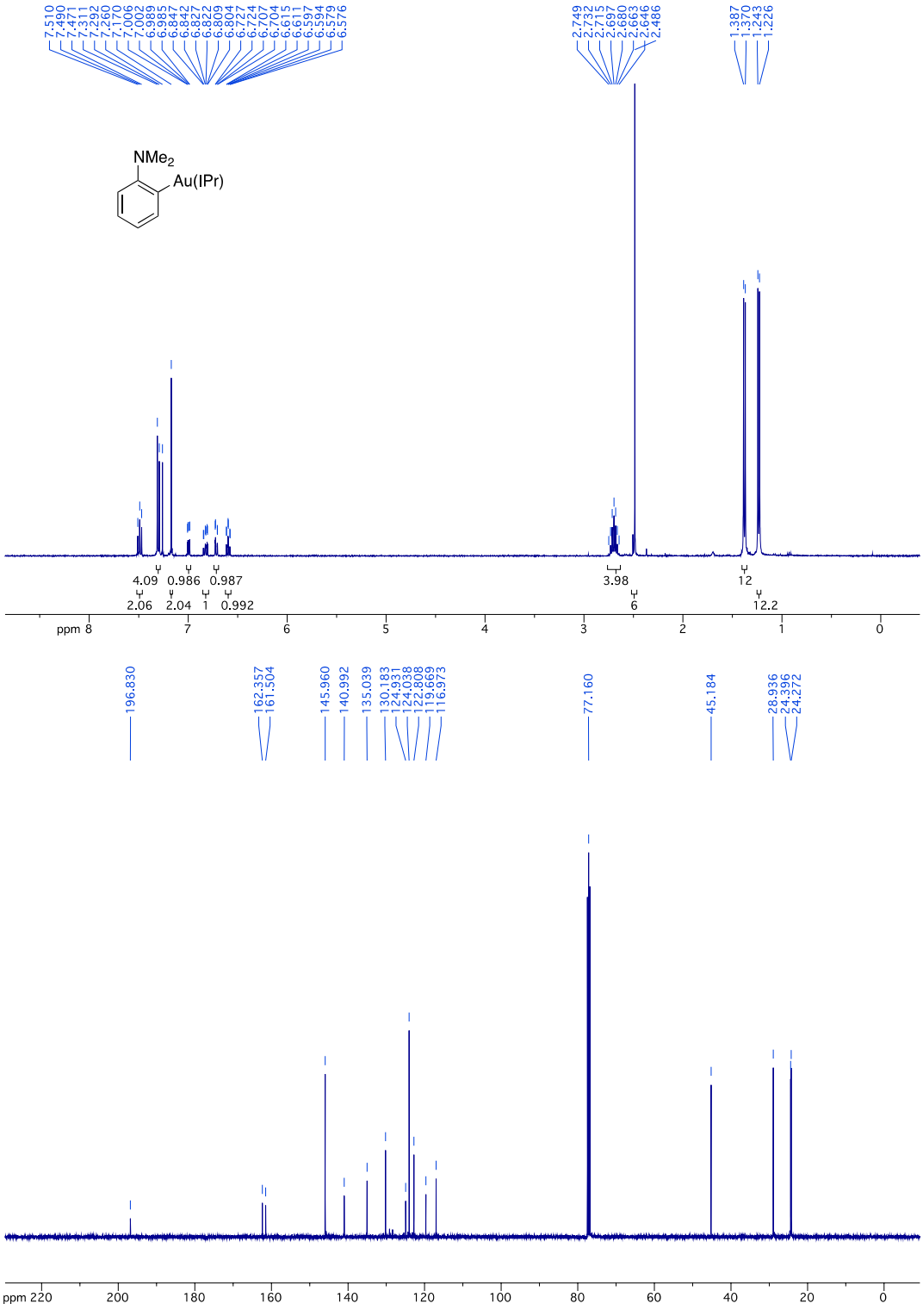
7.464
7.444
7.289
7.270
7.260
7.156
7.033
7.029
7.016
7.012
6.877
6.852
6.854
6.839
6.834
6.718
6.715
6.700
6.697
6.680
6.661
3.376
2.728
2.710
2.693
2.676
2.659
2.641
2.624
1.409
1.392
1.247
1.230
OMe
Au(IPr)
4.02
0.955
2
2
1.96
0.999
3.98
11.9
2.94
11.9
ppm 8
7
6
5
4
3
2
1
0
196.835
166.731
157.033
145.983
141.079
134.852
130.209
125.278
124.036
122.785
120.605
113.191
77.160
56.863
28.964
24.531
24.143
ppm 220
200
180
160
140
120
100
80
60
40
20
0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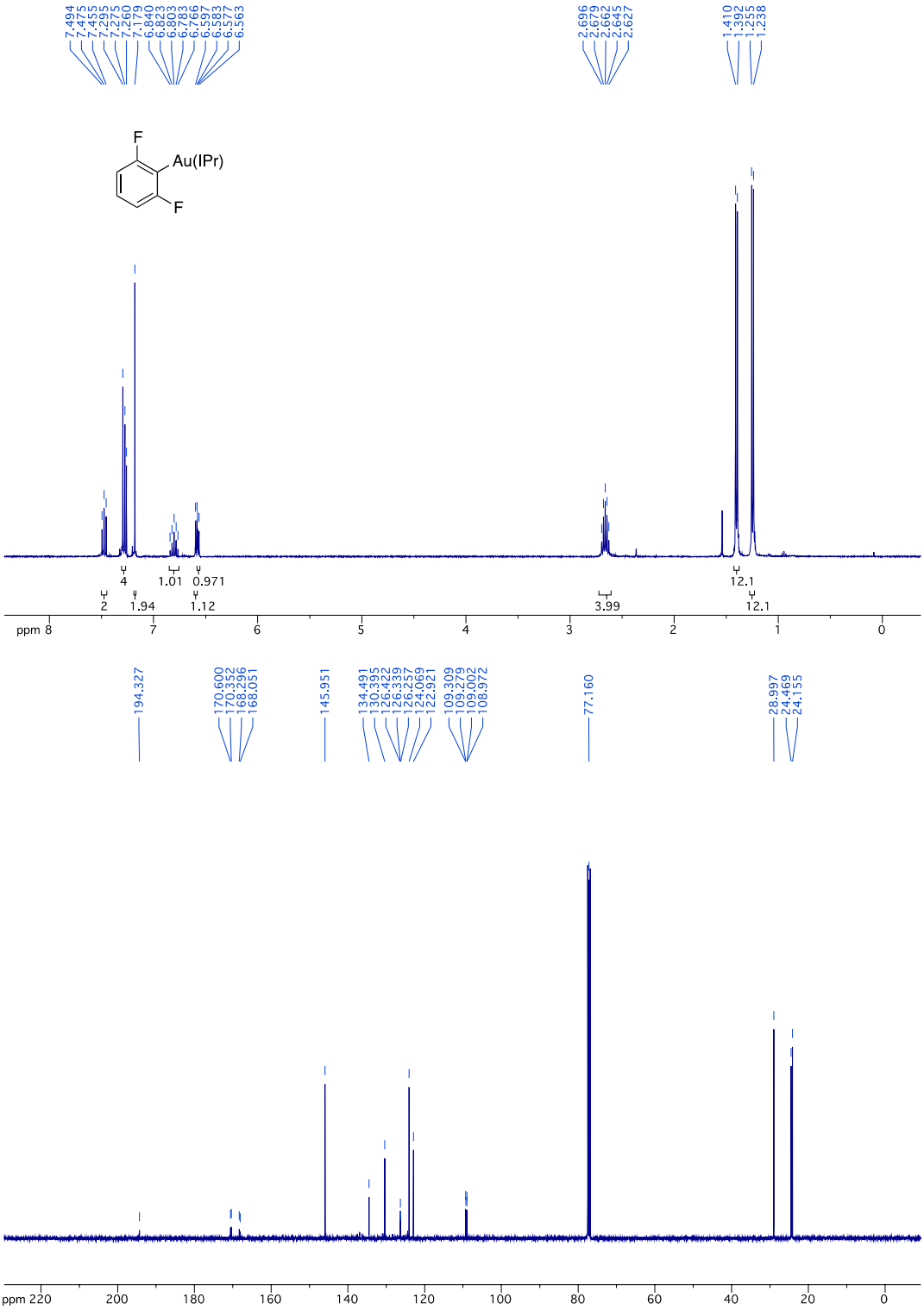
7.490
7.471
7.411
7.311
7.292
7.260
7.170
7.006
7.002
6.989
6.985
6.847
6.842
6.827
6.822
6.809
6.804
6.727
6.724
6.704
6.615
6.611
6.597
6.594
6.579
6.576
2.749
2.732
2.715
2.697
2.680
2.663
2.646
2.486
1.387
1.370
1.243
1.226
NMe2
Au(IPr)
4.09
0.986
0.987
3.98
12
2.06
2.04
1
0.992
6
12.2
ppm 8
7
6
5
4
3
2
1
0
196.830
162.357
161.504
145.960
140.992
135.039
130.183
124.931
124.038
122.808
119.669
116.973
77.160
45.184
28.936
24.396
24.272
ppm 220
200
180
160
140
120
100
80
60
40
20
0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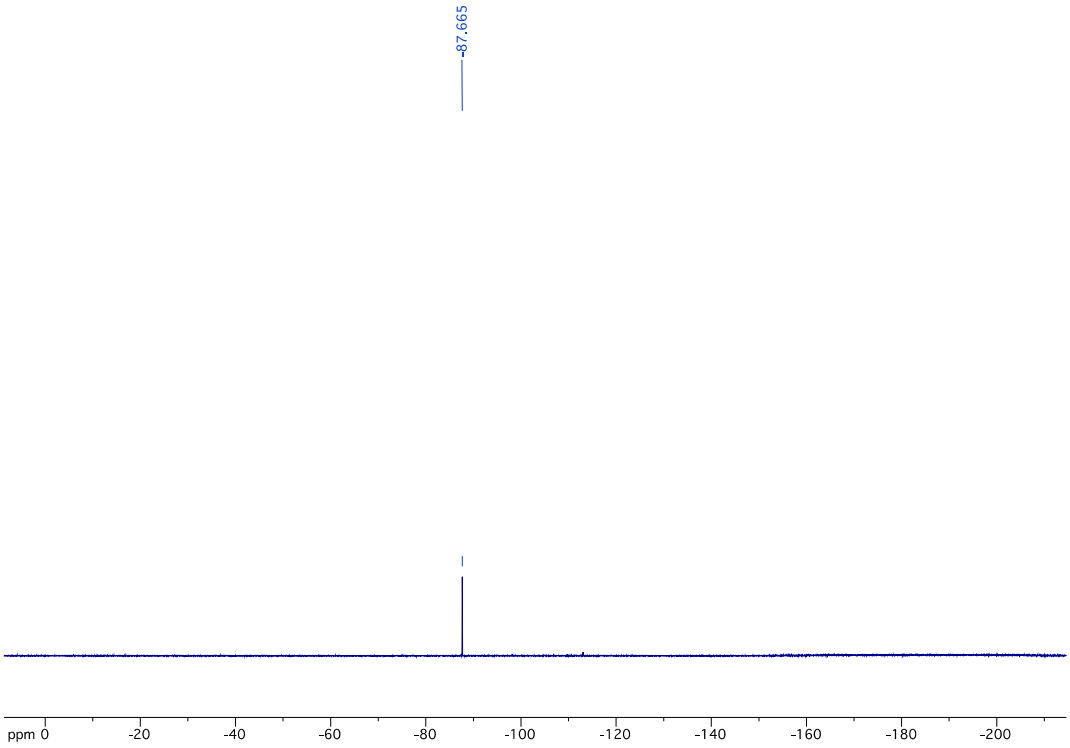
7.475
7.455
7.295
7.275
7.260
7.179
6.840
6.823
6.803
6.783
6.766
6.597
6.583
6.577
6.563
2.696
2.679
2.662
2.645
2.627
1.410
1.392
1.255
1.238
F
Au(IPr)
F
4
1.01
0.971
2
1.94
1.12
3.99
12.1
12.1
ppm 8
7
6
5
4
3
2
1
0
194.327
170.600
170.352
168.296
168.051
145.951
134.491
130.395
126.422
126.339
124.357
124.066
122.921
109.309
109.279
109.002
108.972
77.160
28.997
24.469
24.155
ppm 220
200
180
160
140
120
100
80
60
40
20
0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-40
-60
-80
-100
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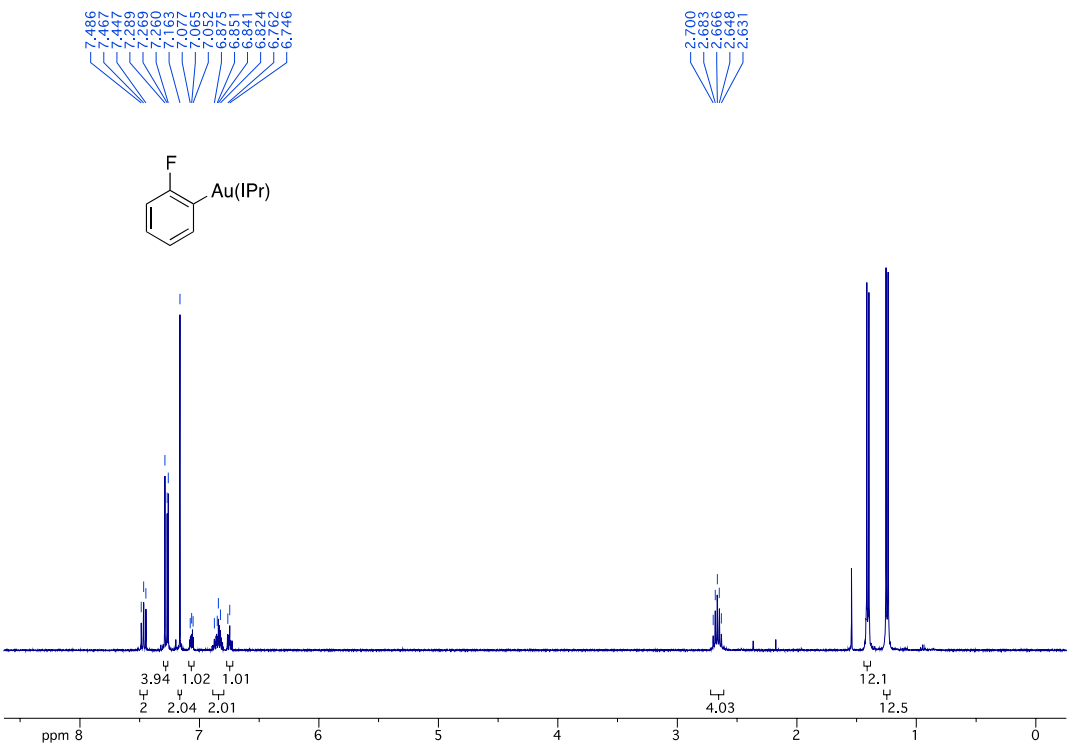
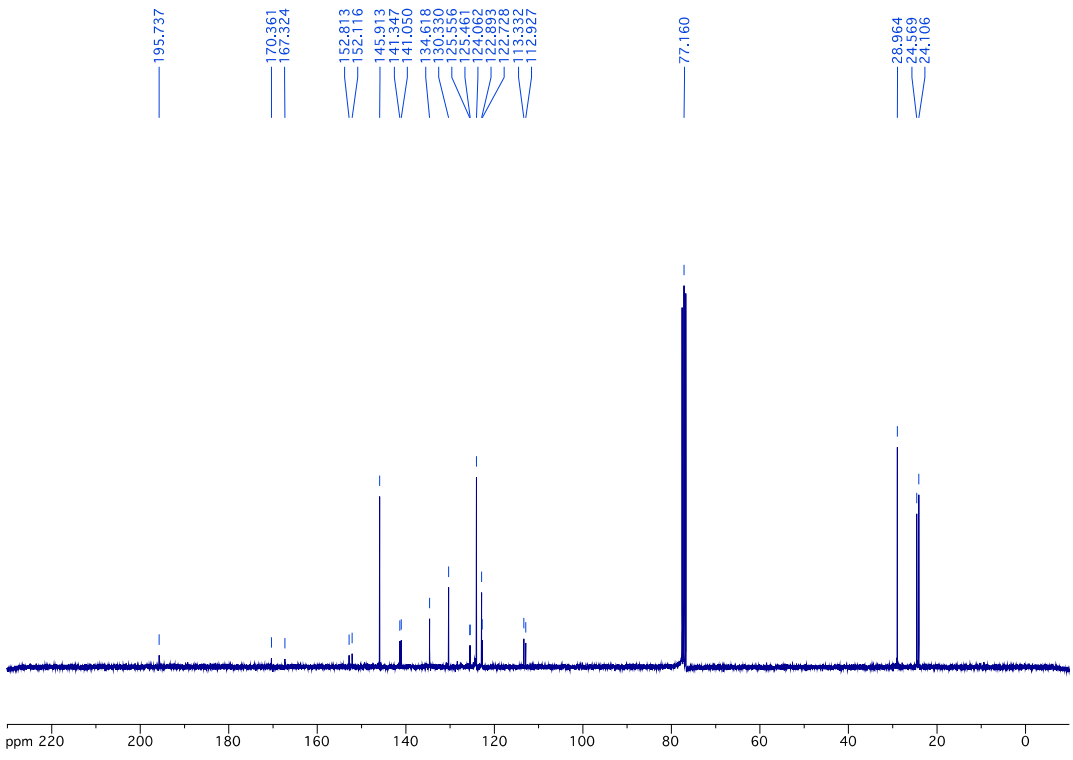
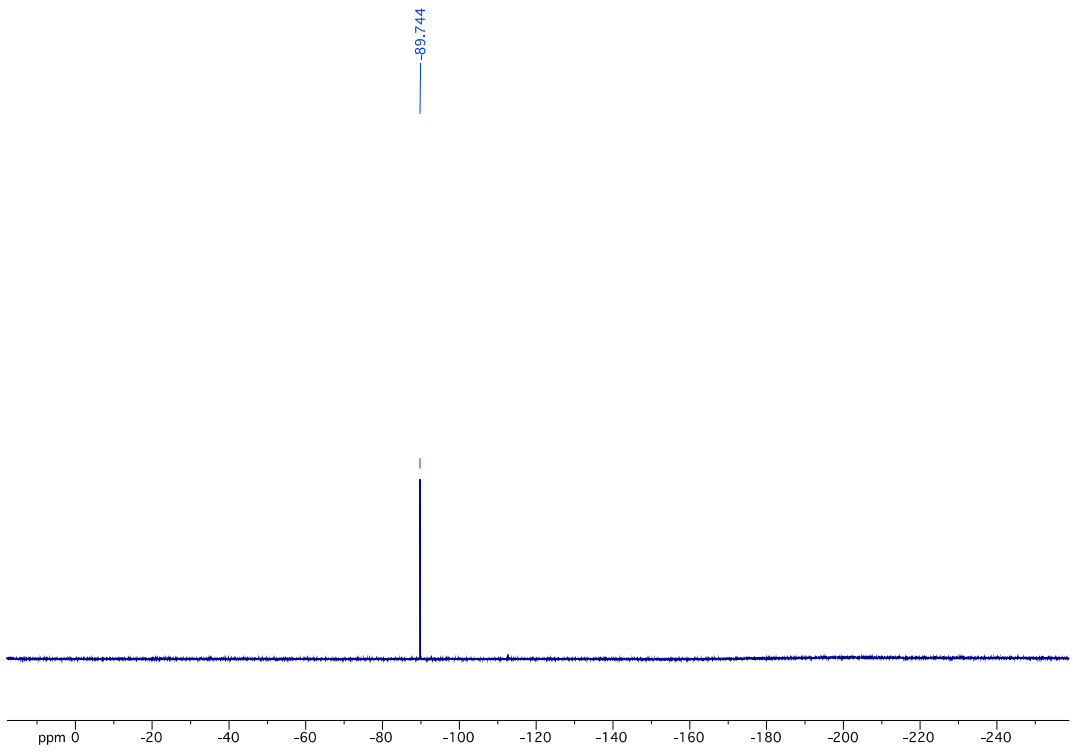
-140
-160
-180
-200


7.486
7.467
7.447
7.289
7.269
7.260
7.163
7.077
7.065
7.052
6.851
6.841
6.824
6.762
6.746
2.700
2.683
2.666
2.648
2.631
F
Au(IPr)
3.94
1.02
1.01
2.04
2.01
4.03
12.1
12.5
ppm 8
7
6
5
4
3
2
1
0


195.737
170.361
167.324
152.813
152.116
145.913
141.347
141.050
134.618
130.330
125.556
125.461
124.062
122.993
122.728
113.332
112.327
77.160
28.964
24.569
24.106
ppm 220
200
180
160
140
120
100
80
60
40
20
0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-20
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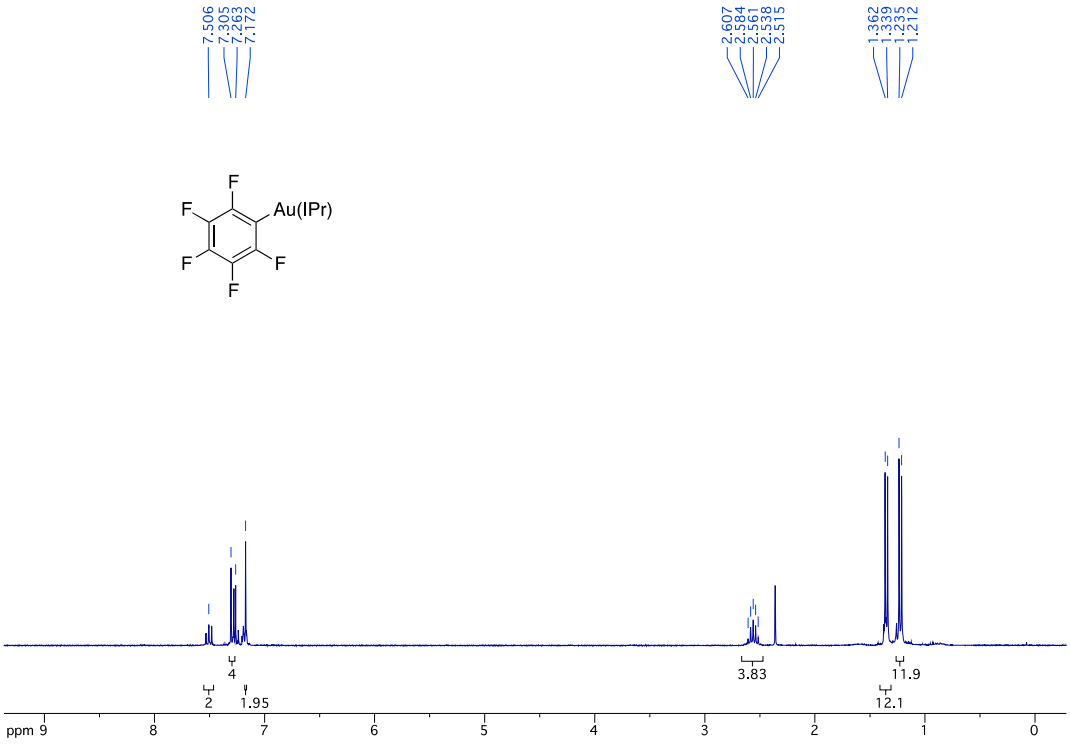
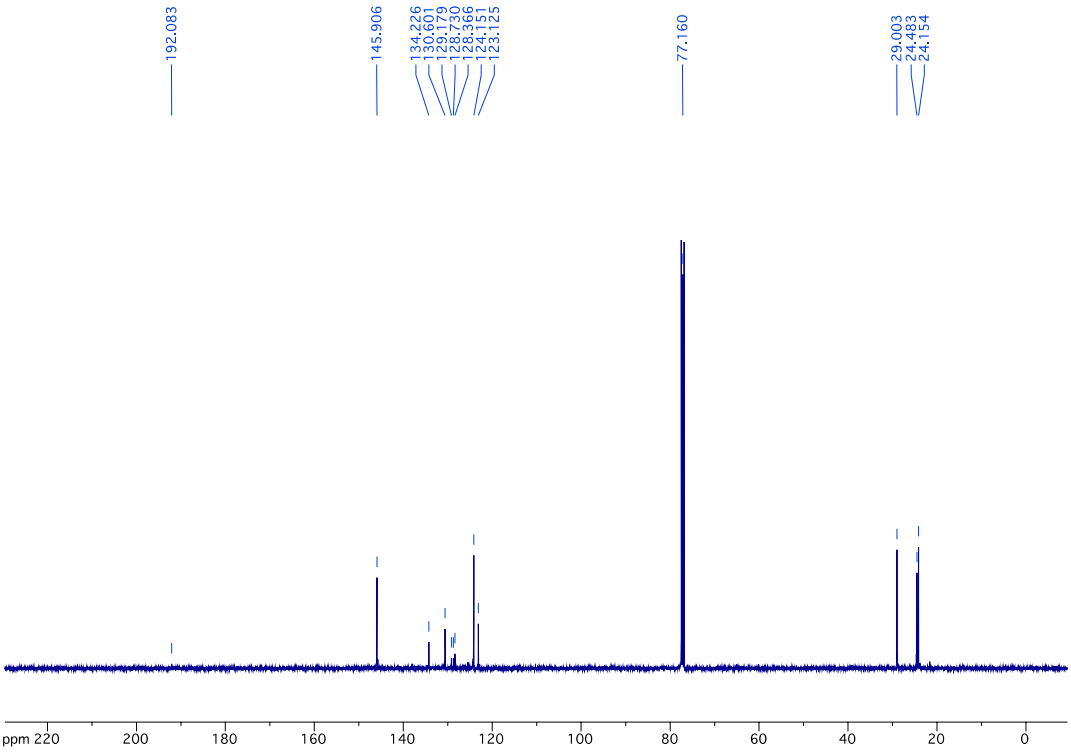
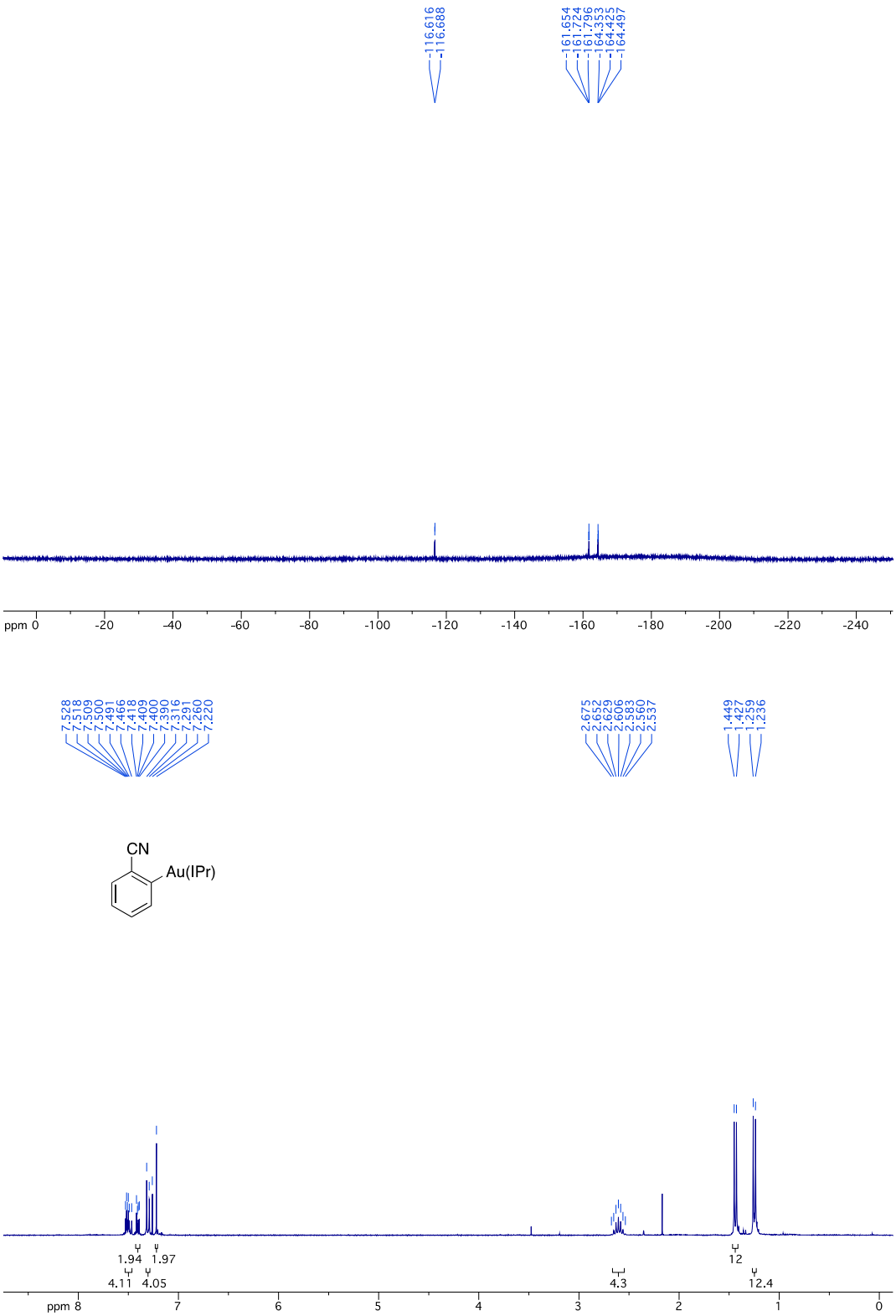
-60
-80
-100
-120
-140
-160
-180
-200
-220
-240


7.506
7.305
7.263
7.172
2.607
2.584
2.561
2.538
2.515
1.362
1.339
1.235
1.212
F
F
Au(IPr)
F
F
F
4
3.83
11.9
2
1.95
12.1
ppm 9
8
7
6
5
4
3
2
1
0


192.083
145.906
134.226
130.601
129.179
128.730
128.366
124.151
123.125
77.160
29.003
24.483
24.154
ppm 220
200
180
160
140
120
100
80
60
40
20
0


116.616
116.688
161.654
161.724
161.796
164.353
164.425
164.497
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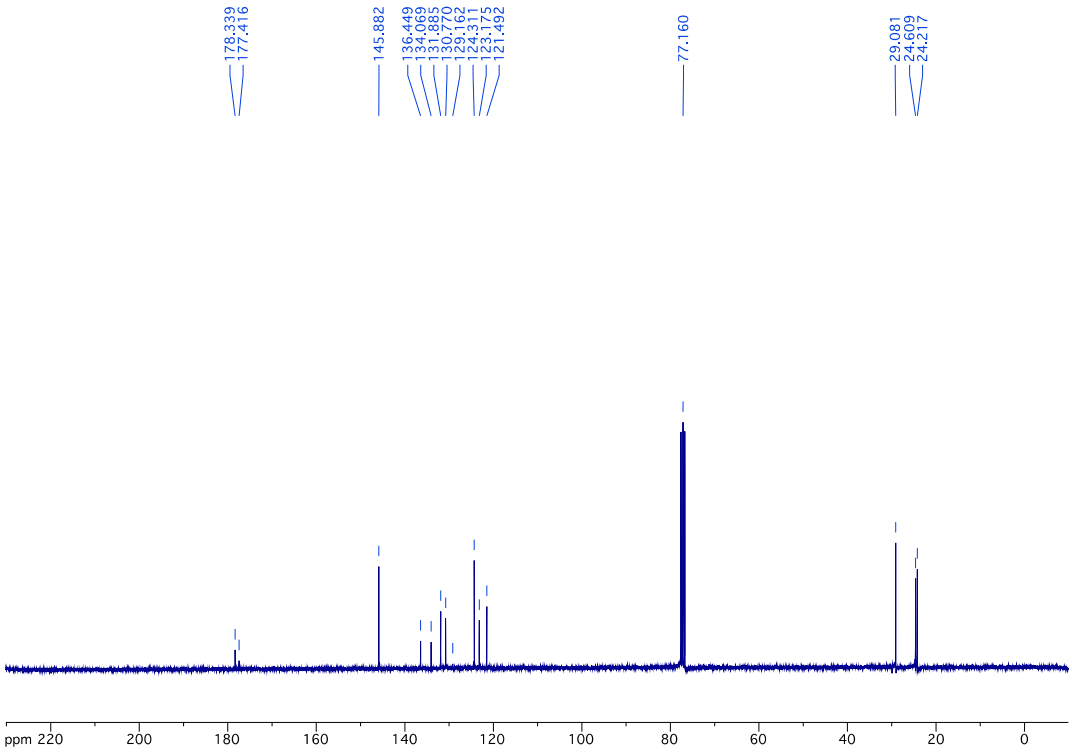
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
-220
-240
7.528
7.518
7.509
7.500
7.491
7.466
7.418
7.409
7.400
7.390
7.316
7.291
7.260
7.220
2.675
2.632
2.629
2.606
2.583
2.560
2.537
1.449
1.427
1.259
1.236
CN
Au(IPr)
1.94
1.97
4.11
4.05
4.3
12
12.4
ppm 8
7
6
5
4
3
2
1
0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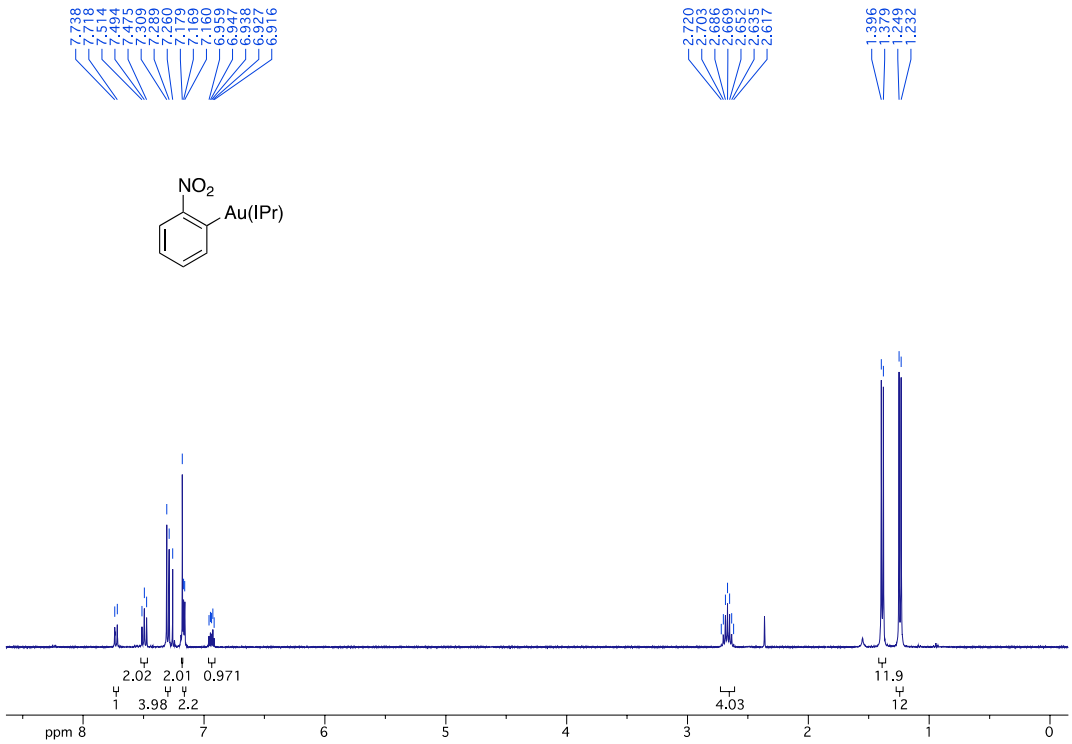
177.416
145.882
136.449
134.069
131.985
130.770
129.162
124.311
123.175
121.492
77.160
29.081
24.609
24.217
ppm 220
200
180
160
140
120
100
80
60
40
20
0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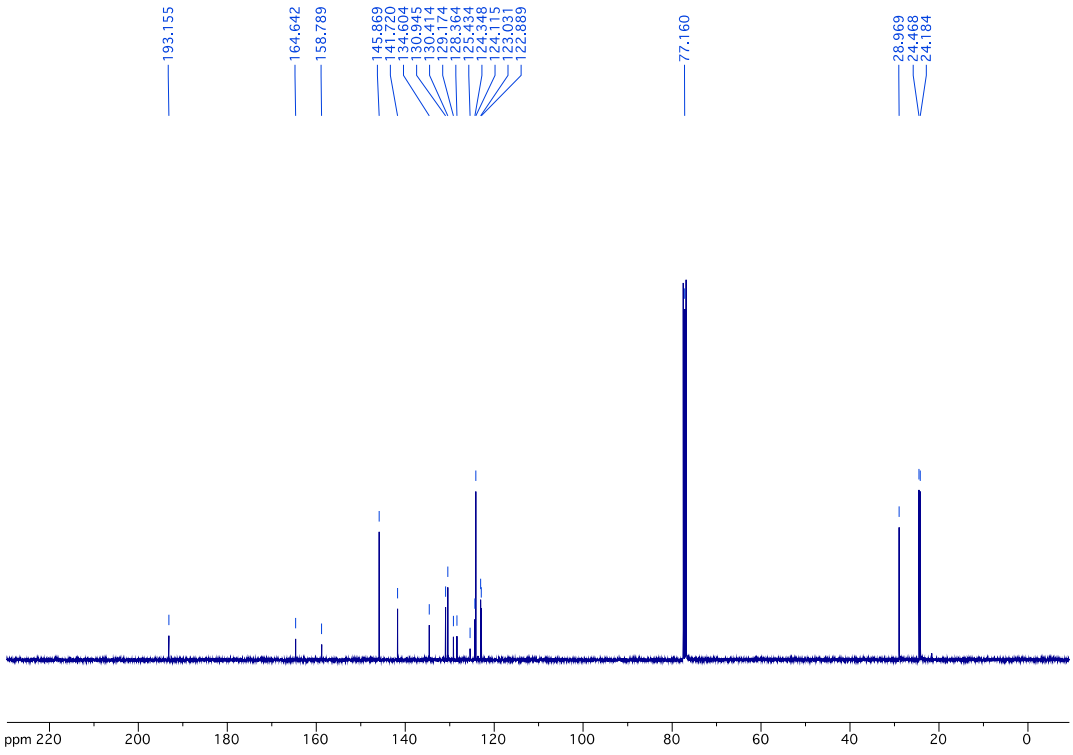
7.718
7.514
7.494
7.475
7.309
7.289
7.280
7.179
7.169
7.160
6.959
6.947
6.938
6.927
6.916
2.720
2.703
2.686
2.669
2.652
2.635
2.617
1.396
1.379
1.249
1.232
NO2
Au(IPr)
2.02
2.01
0.971
1
3.98
2.2
4.03
11.9
12
ppm 8
7
6
5
4
3
2
1
0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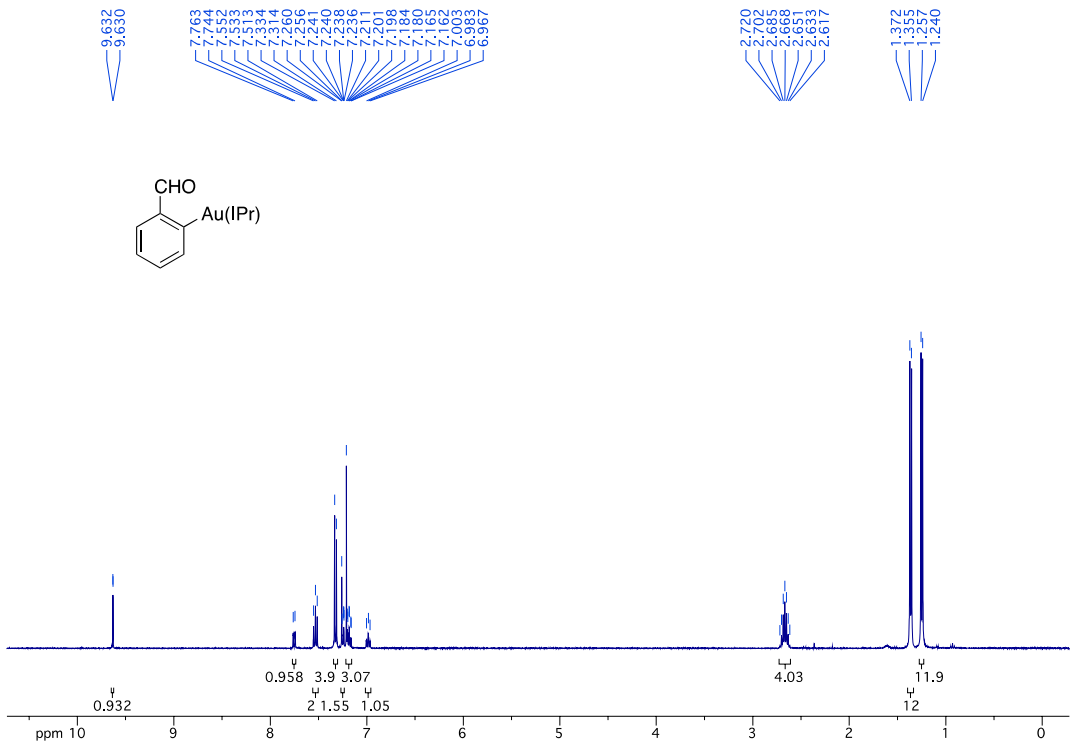
158.789
145.869
141.720
134.604
130.945
130.414
129.174
128.364
125.434
124.348
124.115
123.031
122.889
77.160
28.969
24.468
24.184
ppm 220
200
180
160
140
120
100
80
60
40
20
0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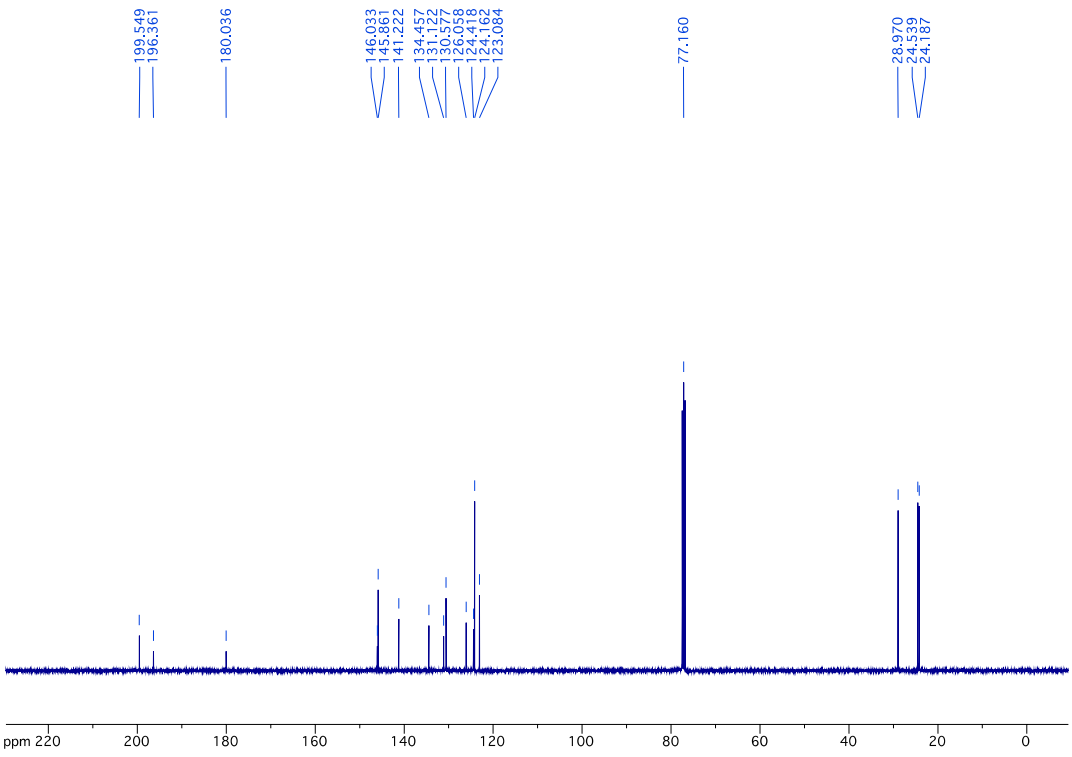
7.744
7.552
7.533
7.513
7.334
7.314
7.260
7.256
7.241
7.240
7.238
7.236
7.211
7.201
7.198
7.184
7.180
7.165
7.162
7.003
6.983
6.967
2.720
2.702
2.685
2.668
2.651
2.633
2.617
1.372
1.355
1.257
1.240
CHO
Au(IPr)
0.932
0.958
3.9
3.07
2
1.55
1.05
4.03
11.9
12
ppm 10
9
8
7
6
5
4
3
2
1
0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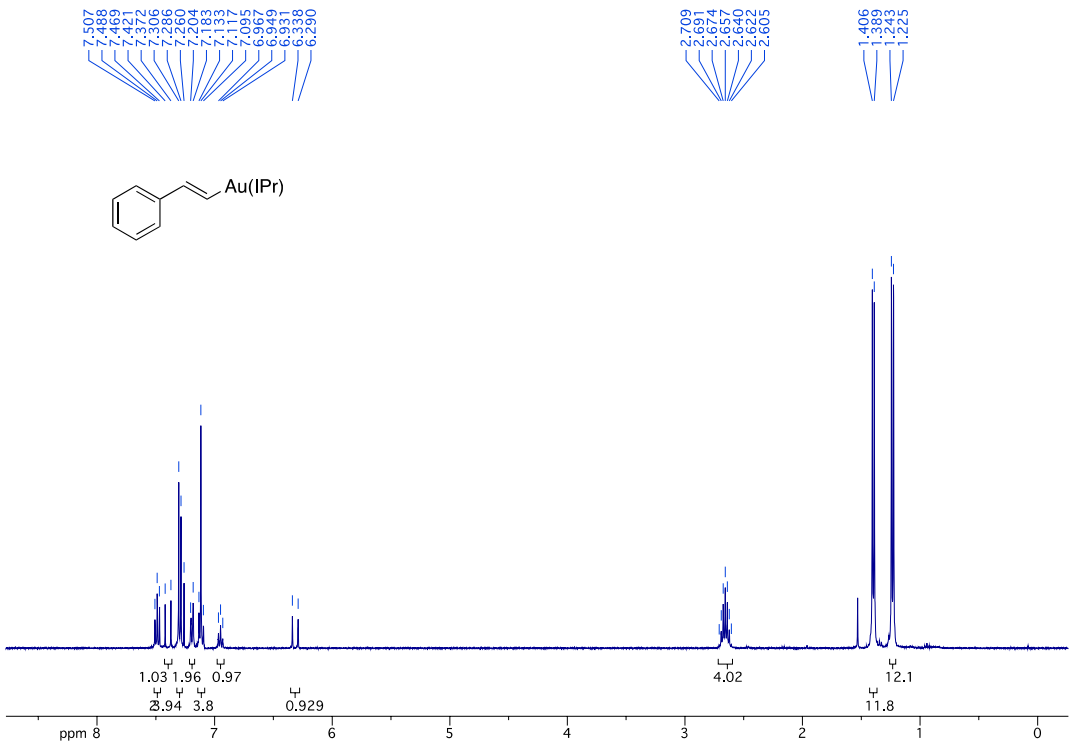
180.036
146.033
145.861
141.222
134.457
131.172
130.577
126.058
124.418
124.162
123.084
77.160
28.970
24.539
24.187
ppm 220
200
180
160
140
120
100
80
60
40
20
0


7.507
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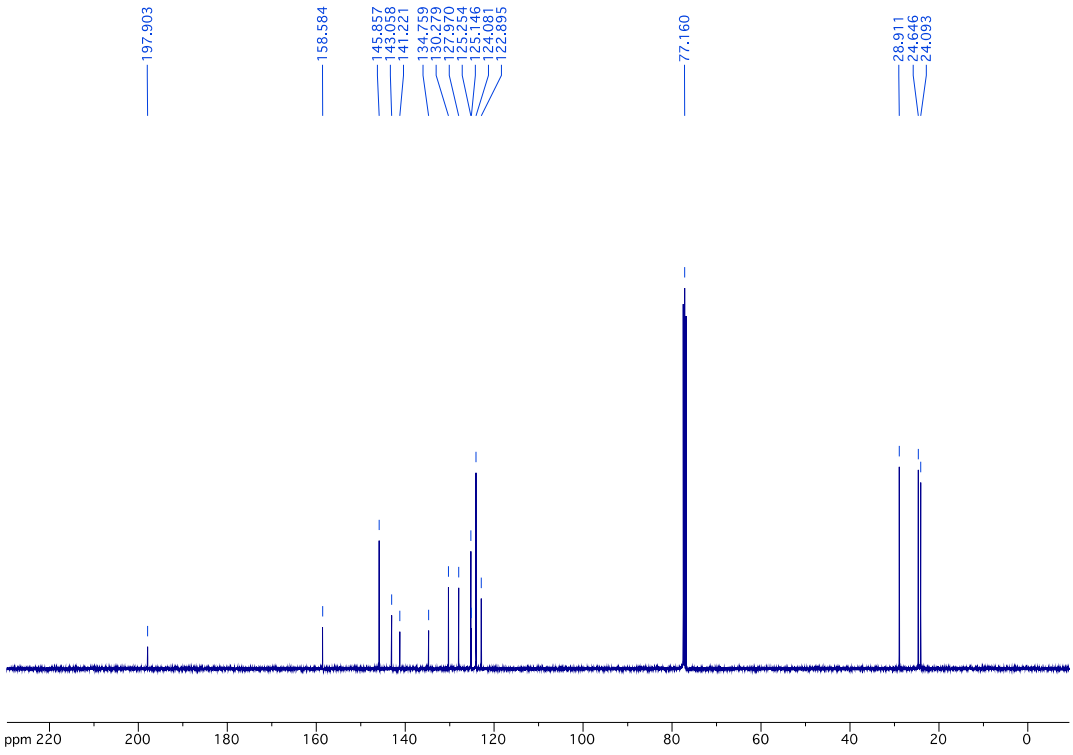
7.469
7.421
7.372
7.306
7.286
7.260
7.204
7.183
7.133
7.117
7.095
6.967
6.949
6.931
6.338
6.290
2.709
2.691
2.674
2.657
2.640
2.622
2.605
1.406
1.389
1.243
1.225
Au(IPr)
1.03
1.96
0.97
3.94
3.8
0.929
4.02
12.1
11.8
ppm 8
7
6
5
4
3
2
1
0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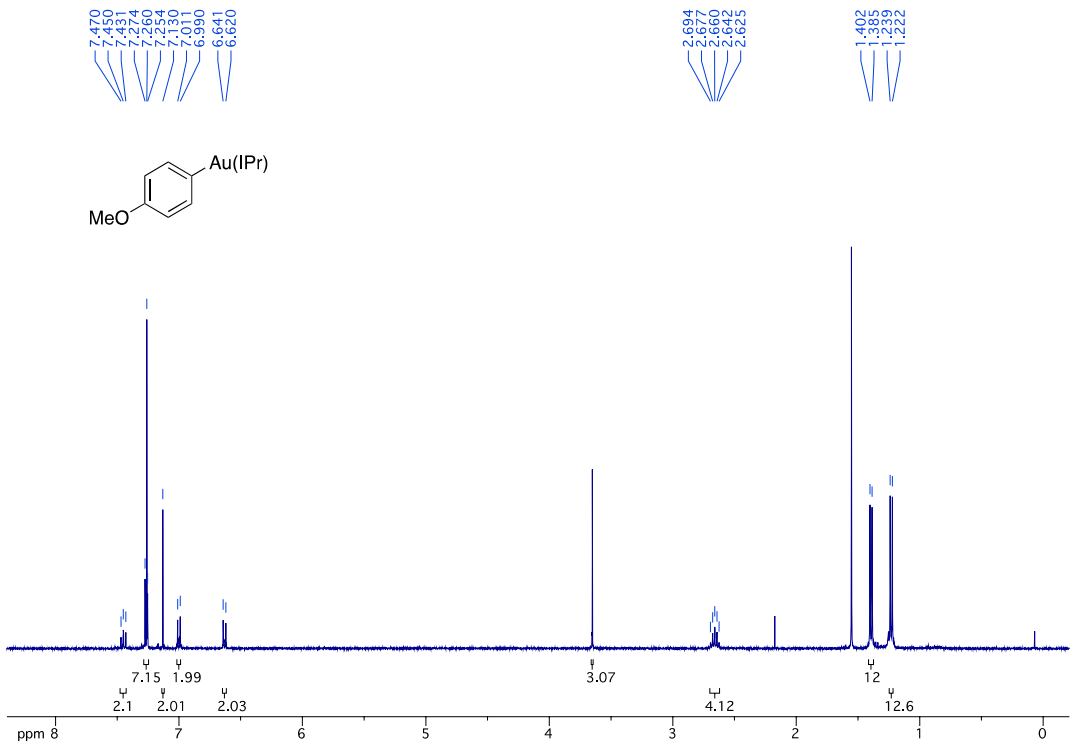
141.221
134.759
130.279
127.970
125.434
123.146
123.081
122.895
77.160
28.911
24.646
24.093
ppm 220
200
180
160
140
120
100
80
60
40
20
0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7.450
7.431
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7.260
7.254
7.130
7.011
6.990
6.641
6.620
2.694
2.677
2.660
2.642
2.625
1.402
1.385
1.239
1.222
Au(IPr)
MeO
7.15
1.99
3.07
12
2.1
2.01
2.03
4.12
12.6
ppm 8
7
6
5
4
3
2
1
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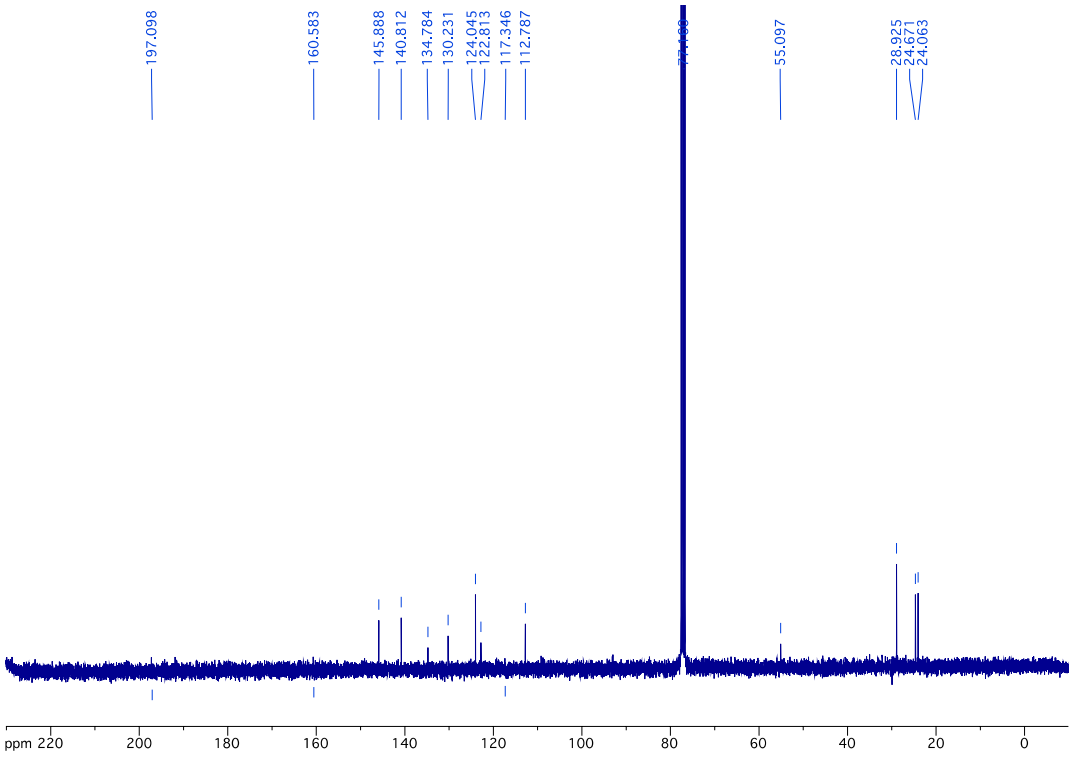
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140.812
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130.231
124.045
122.813
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55.097
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24.671
24.063
ppm 220
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180
160
140
120
100
80
60
40
20
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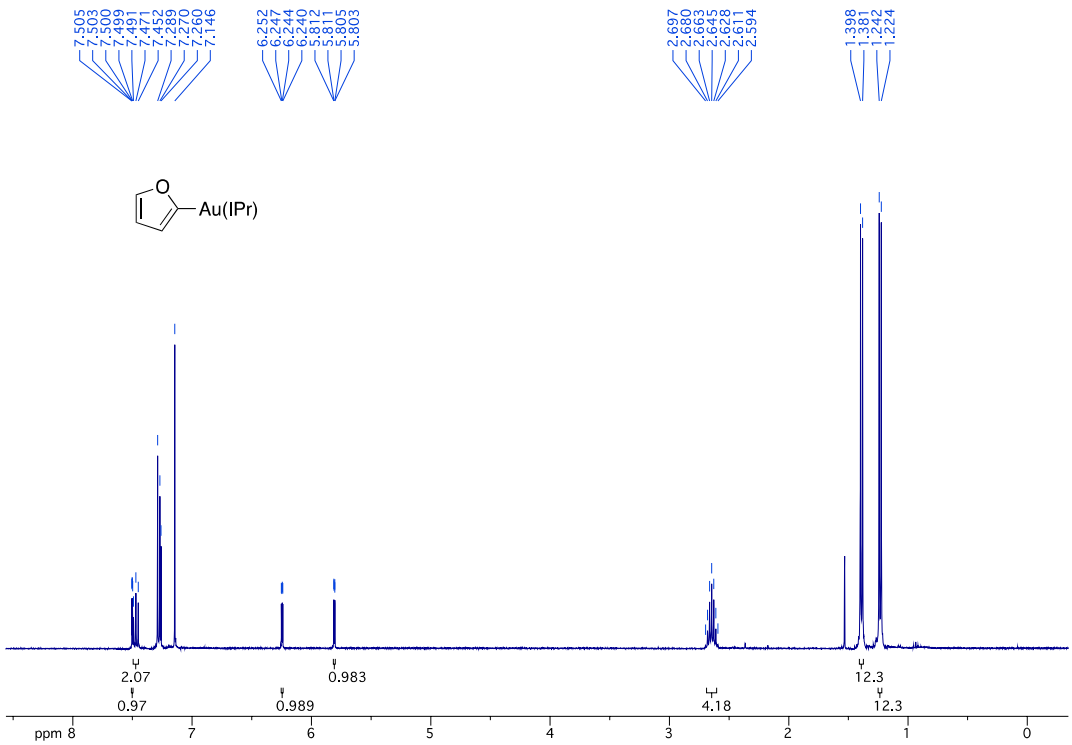
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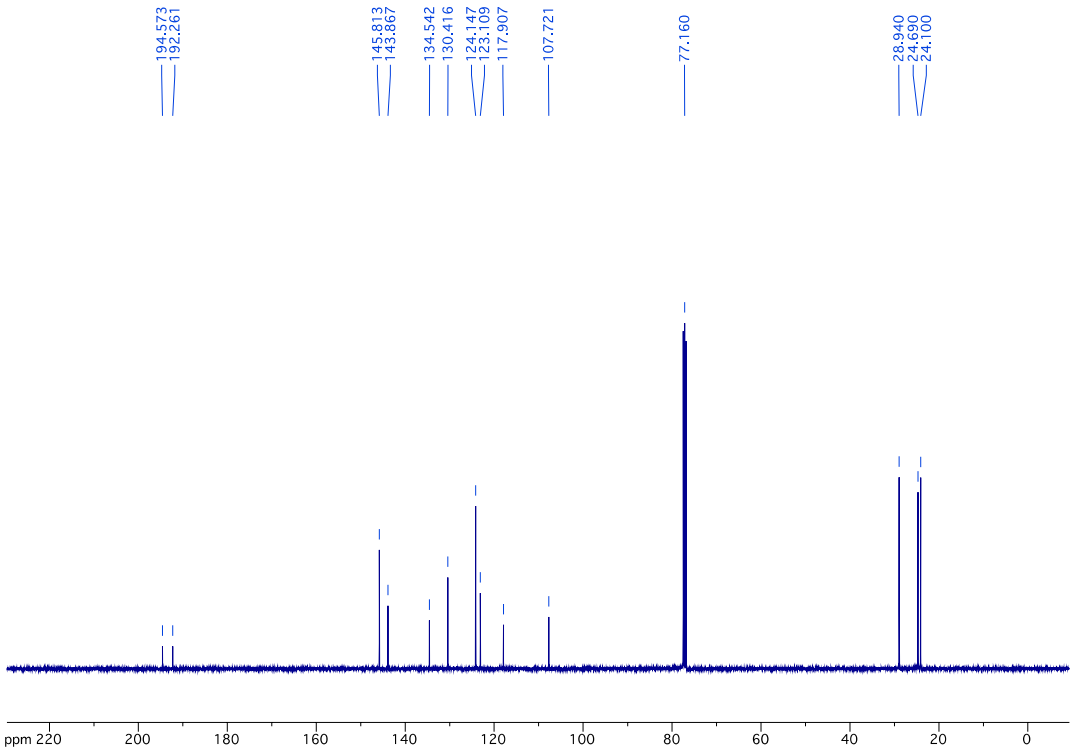
6.247
6.244
6.240
5.812
5.811
5.805
5.803
2.697
2.680
2.663
2.645
2.628
2.611
2.594
1.398
1.381
1.242
1.224
O
Au(IPr)
2.07
0.97
0.983
0.989
4.18
12.3
12.3
ppm 8
7
6
5
4
3
2
1
0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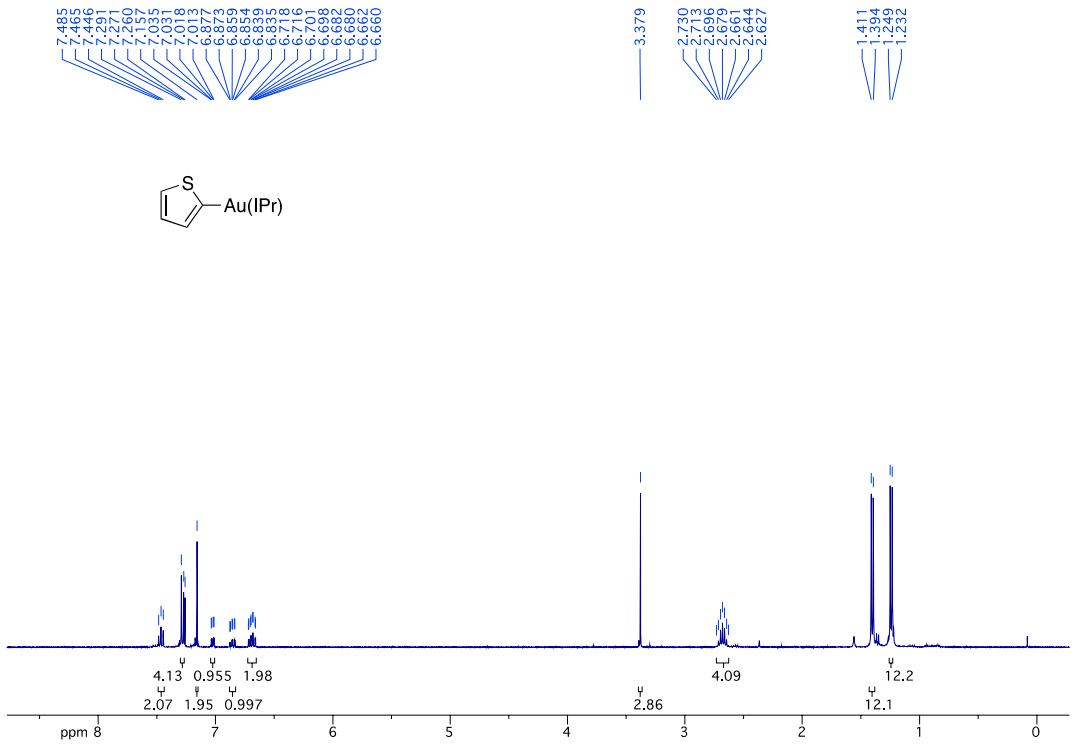
192.261
145.813
143.867
134.542
130.416
124.147
123.109
117.907
107.721
77.160
28.940
24.690
24.100
ppm 220
200
180
160
140
120
100
80
60
40
20
0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7.465
7.446
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7.271
7.260
7.157
7.035
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7.018
7.013
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6.873
6.859
6.854
6.839
6.835
6.718
6.716
6.701
6.698
6.682
6.680
6.662
6.660
3.379
2.730
2.713
2.696
2.679
2.661
2.644
2.627
1.411
1.394
1.249
1.232
S
Au(IPr)
4.13
0.955
1.98
2.07
1.95
0.997
2.86
4.09
12.2
12.1
ppm 8
7
6
5
4
3
2
1
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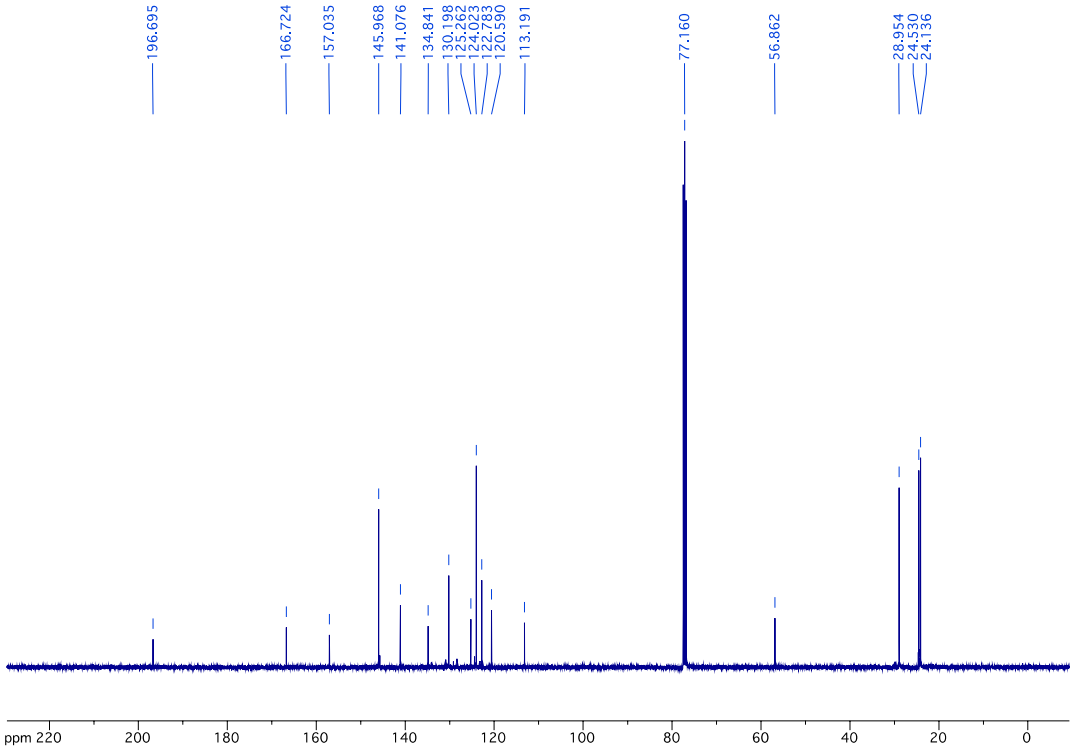
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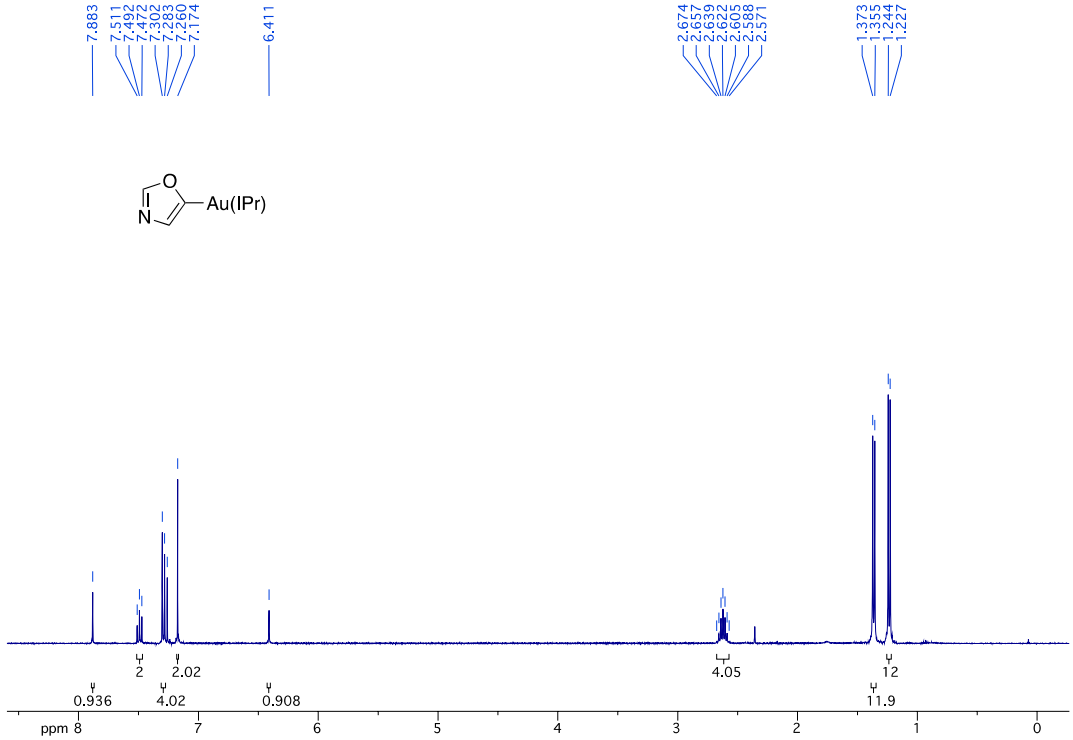
157.035
145.968
141.076
134.841
130.198
125.262
124.023
122.783
120.590
113.191
77.160
56.862
28.954
24.530
24.136
ppm 220
200
180
160
140
120
100
80
60
40
20
0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7.511
7.492
7.472
7.302
7.283
7.260
7.174
6.411
2.674
2.657
2.639
2.622
2.605
2.588
2.571
1.373
1.355
1.244
1.227
O
N
Au(IPr)
0.936
2
2.02
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0.908
4.05
12
11.9
ppm 8
7
6
5
4
3
2
1
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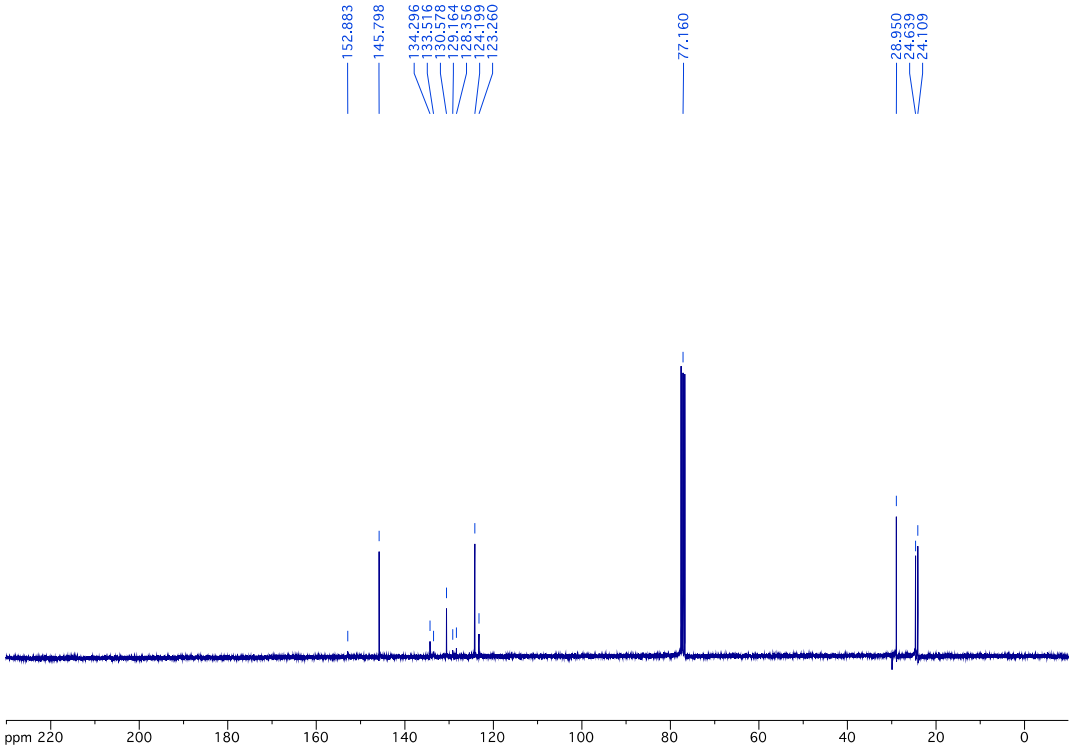
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130.578
129.164
128.356
124.199
123.260
77.160
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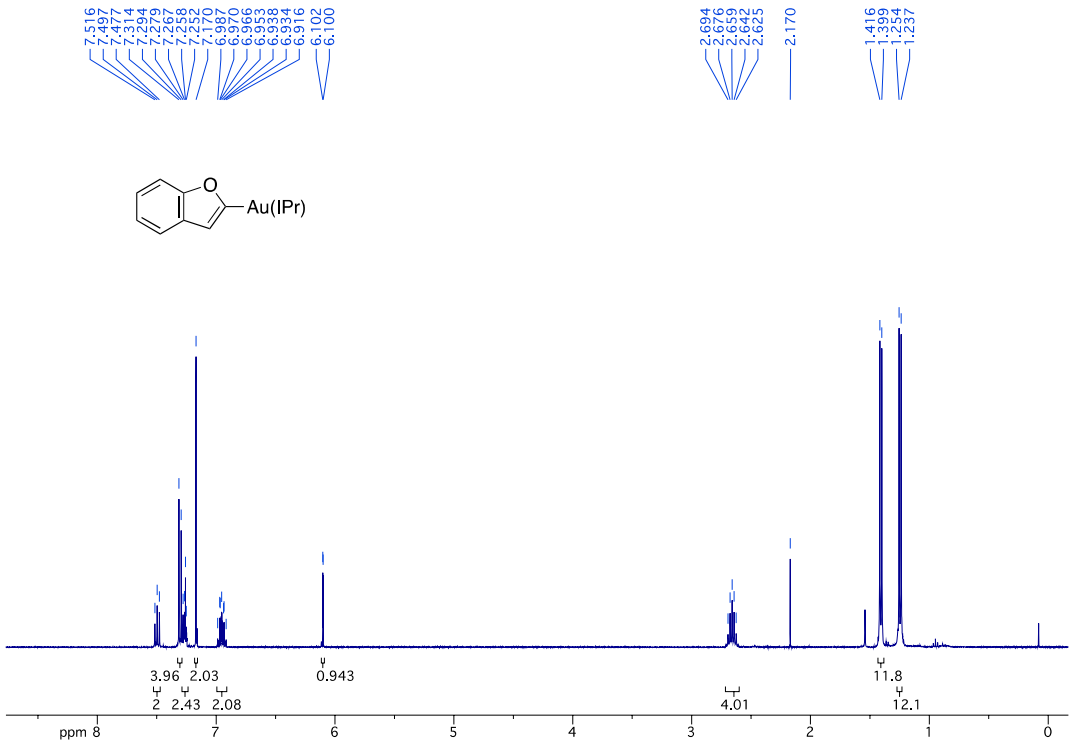
24.633
24.109
ppm 220
200
180
160
140
120
100
80
60
40
20
0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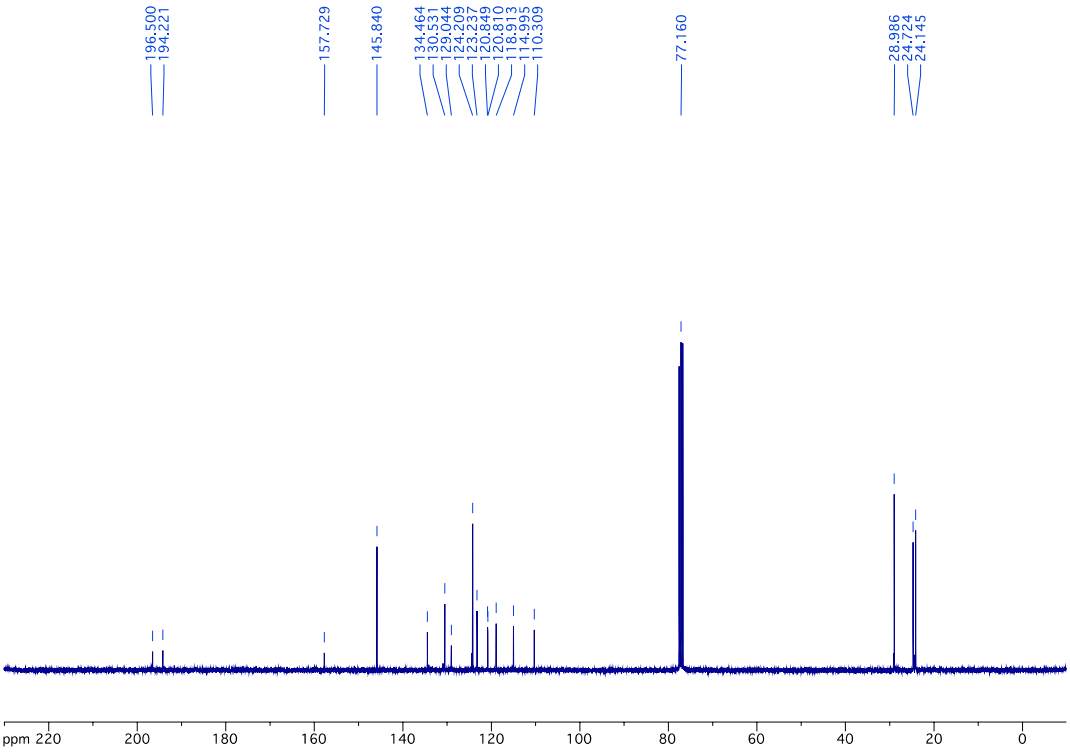
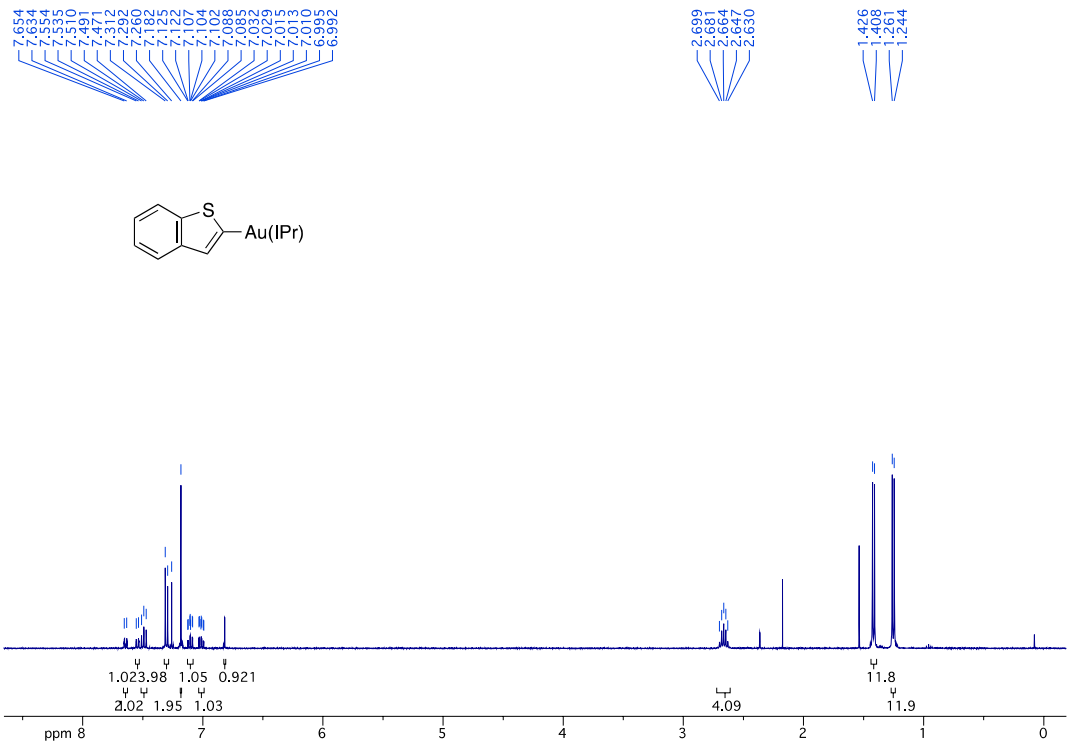
7.294
7.279
7.267
7.258
7.252
7.170
6.987
6.970
6.966
6.953
6.938
6.934
6.916
6.102
6.100
2.694
2.676
2.659
2.642
2.625
2.170
1.416
1.399
1.254
1.237
O
Au(IPr)
3.96
2.03
0.943
2
2.43
2.08
4.01
11.8
12.1
ppm 8
7
6
5
4
3
2
1
0


196.500
194.221
157.729
145.840
134.464
130.531
129.044
124.259
124.037
120.849
120.810
118.913
114.995
110.309
77.160
28.986
24.724
24.145
ppm 220
200
180
160
140
120
100
80
60
40
20
0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7.634
7.554
7.535
7.510
7.491
7.471
7.312
7.292
7.260
7.182
7.122
7.107
7.104
7.102
7.088
7.085
7.032
7.029
7.015
7.013
7.010
6.995
6.992
2.699
2.681
2.664
2.647
2.630
1.426
1.408
1.261
1.244
S
Au(IPr)
1.02
3.98
1.05
0.921
2.02
1.95
1.03
4.09
11.8
11.9
ppm 8
7
6
5
4
3
2
1
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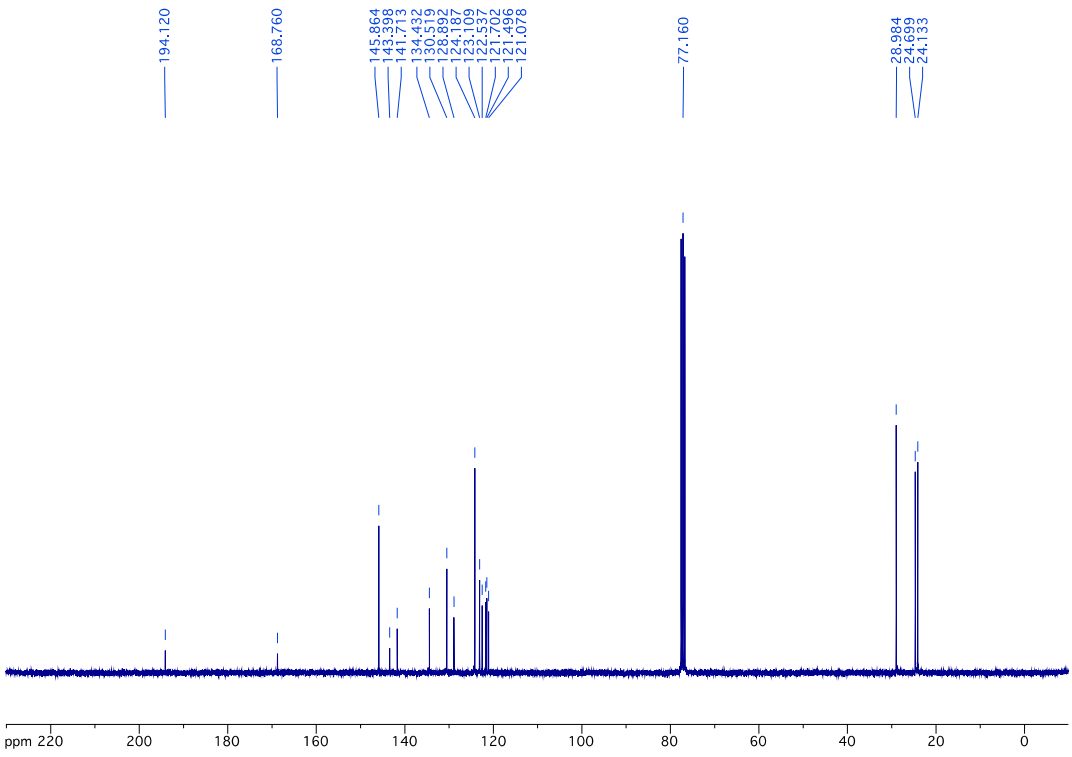

References

[1] S. Gaillard, A. M. Z. Slawin and S. P. Nolan, *Chem. Commun*. 2010, **46**, 2742