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Supporting Information

for

Gold(I) N-heterocyclic carbene precursors for focused electron beam-induced deposition

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Additional experimental data

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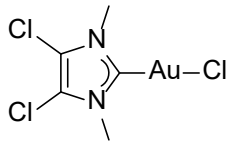
NMR characterization and cold finger sublimation experiments of the precursors 1–7

1 (Cl,Me)AuCl



Sublimation. From top to bottom in order: **1**, sublimed obtained for three different experiments at a registered temperature of: 100.7 °C, 99.6 °C, 100.9 °C.

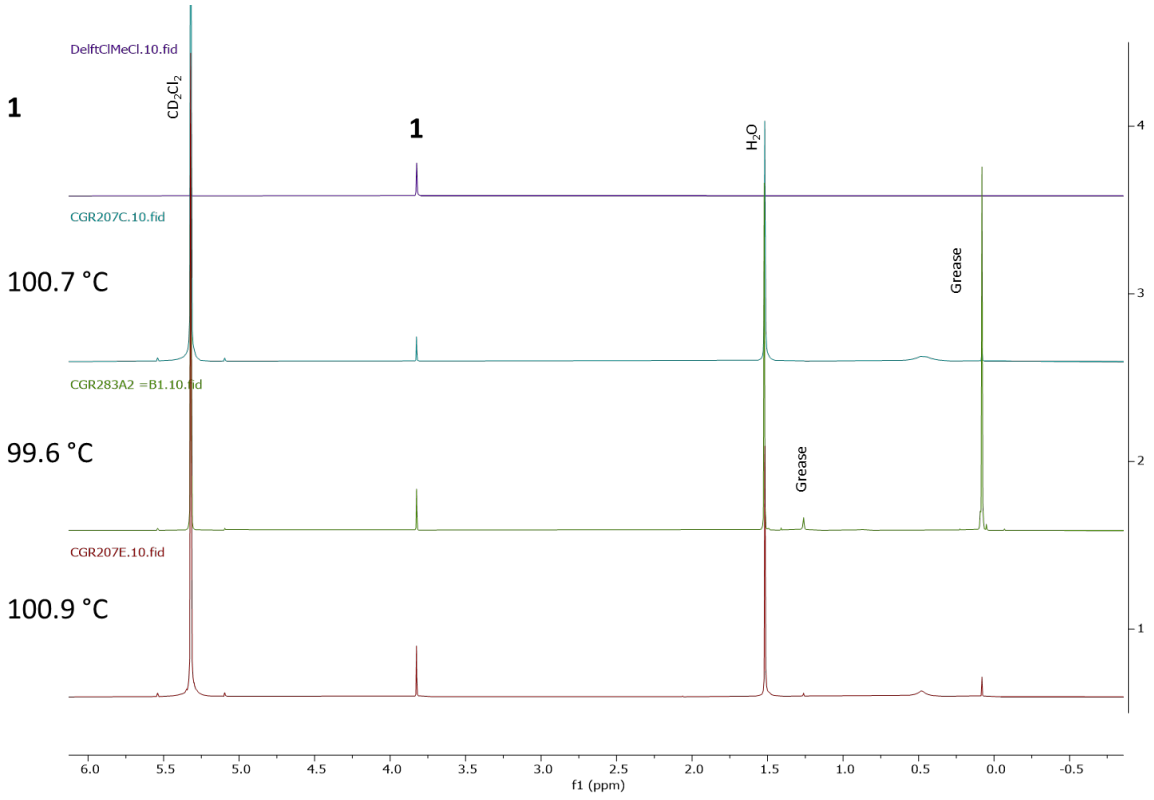
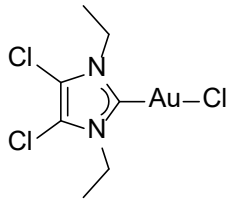


Figure S1: ^{1}H NMR spectra stack plot for **1** and the obtained sublimation materials (400 MHz or 300 MHz, CD_2Cl_2).

2 (Cl,Et)AuCl



Elemental analysis: Calcd. for $C_7H_{10}AuCl_3N_2$: C, 19.76; H, 2.37; N, 6.58%. Found: C, 19.80; H, 2.35; N, 6.56%.

Sublimation. From top to bottom in order: **2**, sublimed obtained for three different experiments at a registered temperature of: 78.3 °C, 78.3 °C, 78.2 °C.

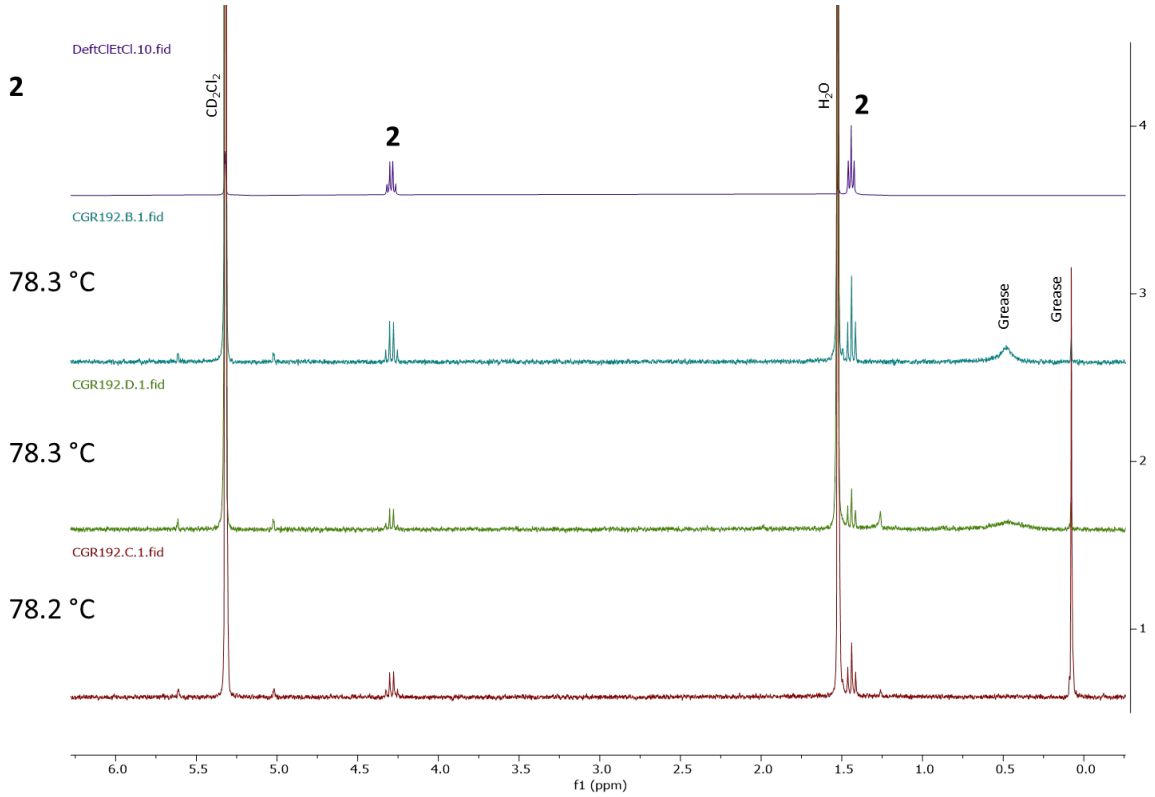
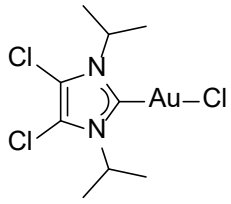


Figure S2: ^{1}H NMR spectra stack plot for **2** and the obtained sublimation materials (400 MHz or 300 MHz, CD_2Cl_2).

3 (Cl,iPr)AuCl



Elemental analysis: Calcd. for $C_9H_{14}AuCl_3N_2$: C, 23.83; H, 3.11; N, 6.18%. Found: C, 23.81; H, 3.09; N, 6.19%.

Sublimation. From top to bottom in order: **3**, sublimed obtained for three different experiments at a registered temperature of: 75.2 °C, 76.2 °C, 75.2 °C.

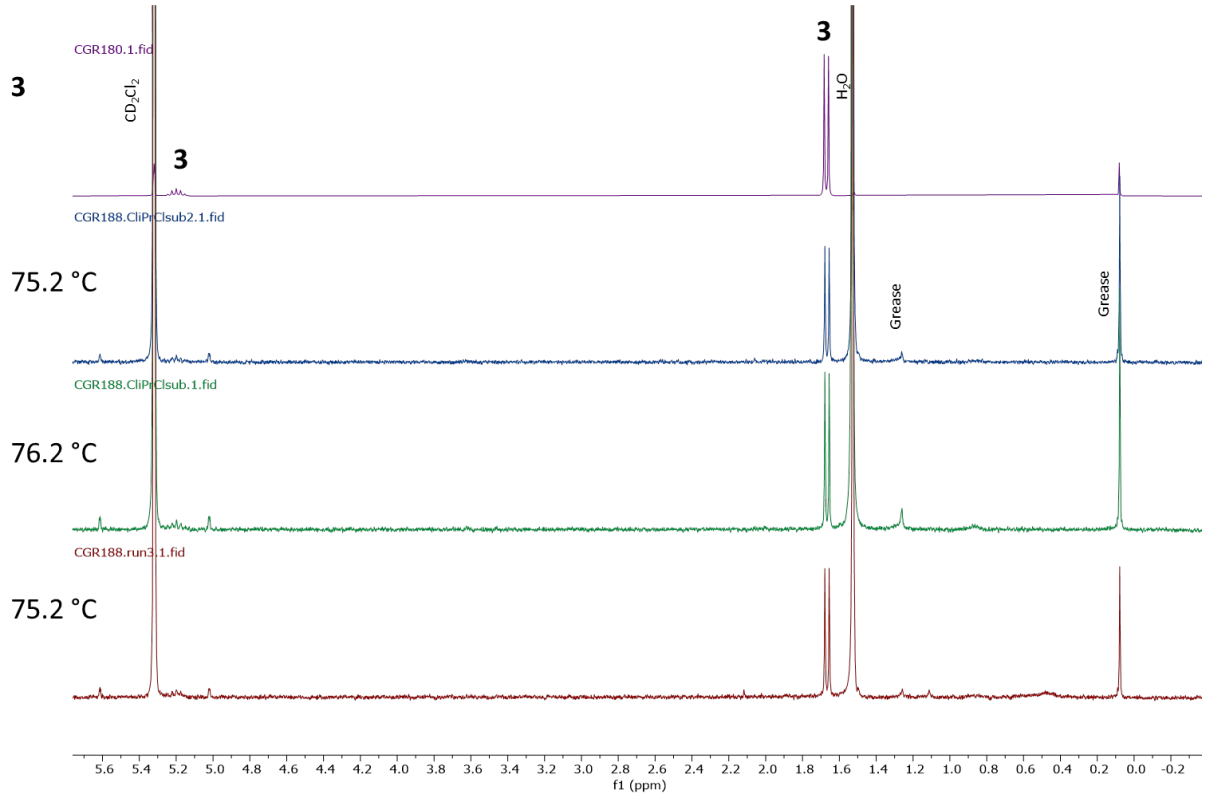
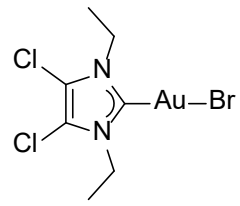


Figure S3: ^{1}H NMR spectra stack plot for **3** and the obtained sublimation materials (400 MHz or 300 MHz, CD_2Cl_2).

4 (Cl,Et)AuBr



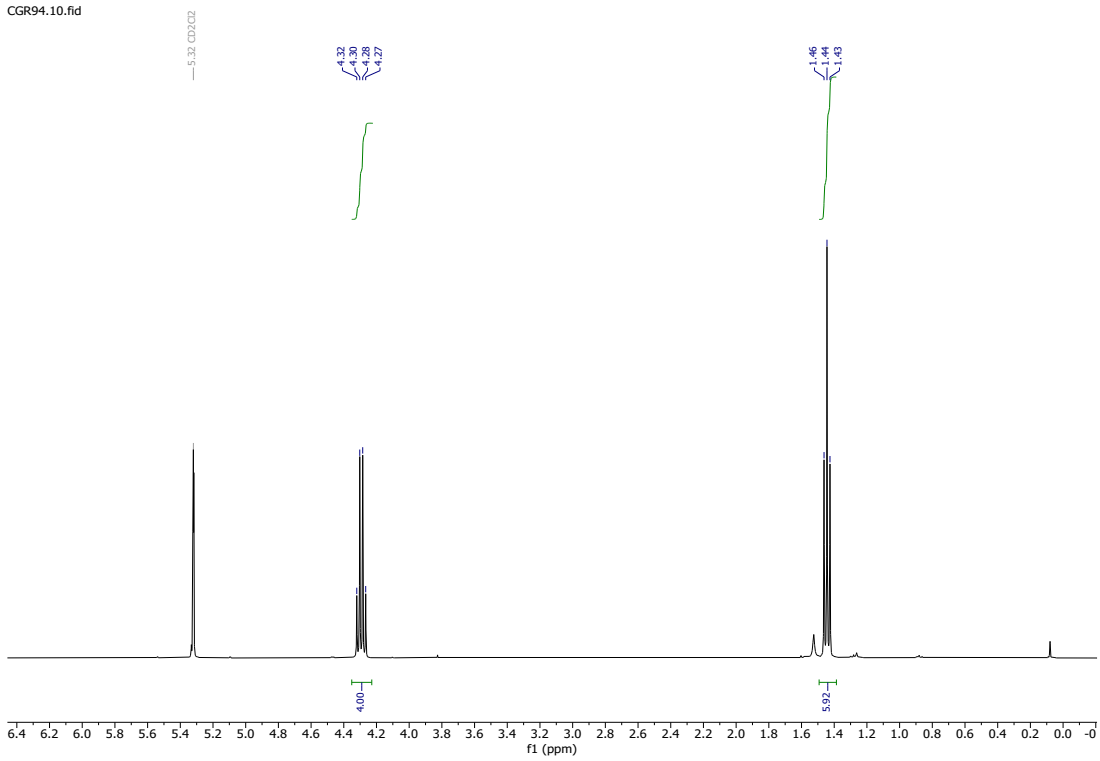


Figure S4: ^{1}H NMR spectrum of **4** (400 MHz, CD_2Cl_2).

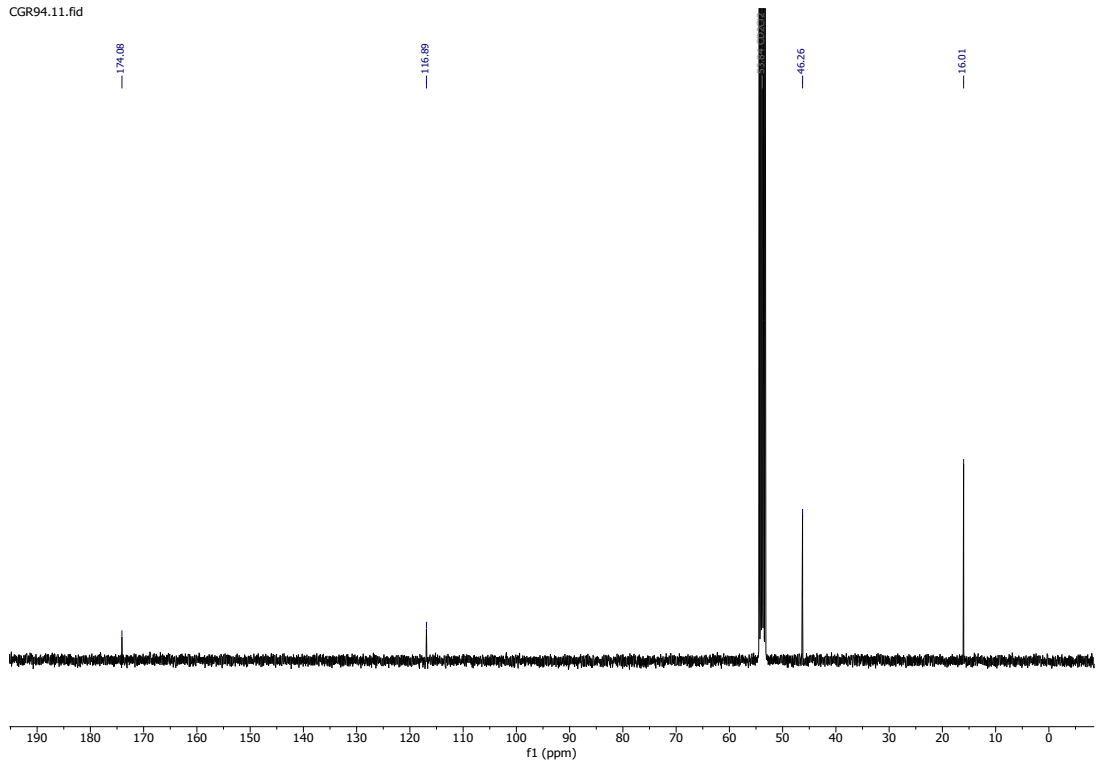


Figure S5: ^{13}C NMR spectrum of **4** (101 MHz, CD_2Cl_2).

Sublimation. From top to bottom in order: **4**, sublimed obtained for three different experiments at a registered temperature of: 77.3 °C, 77.2 °C, 77.4 °C.

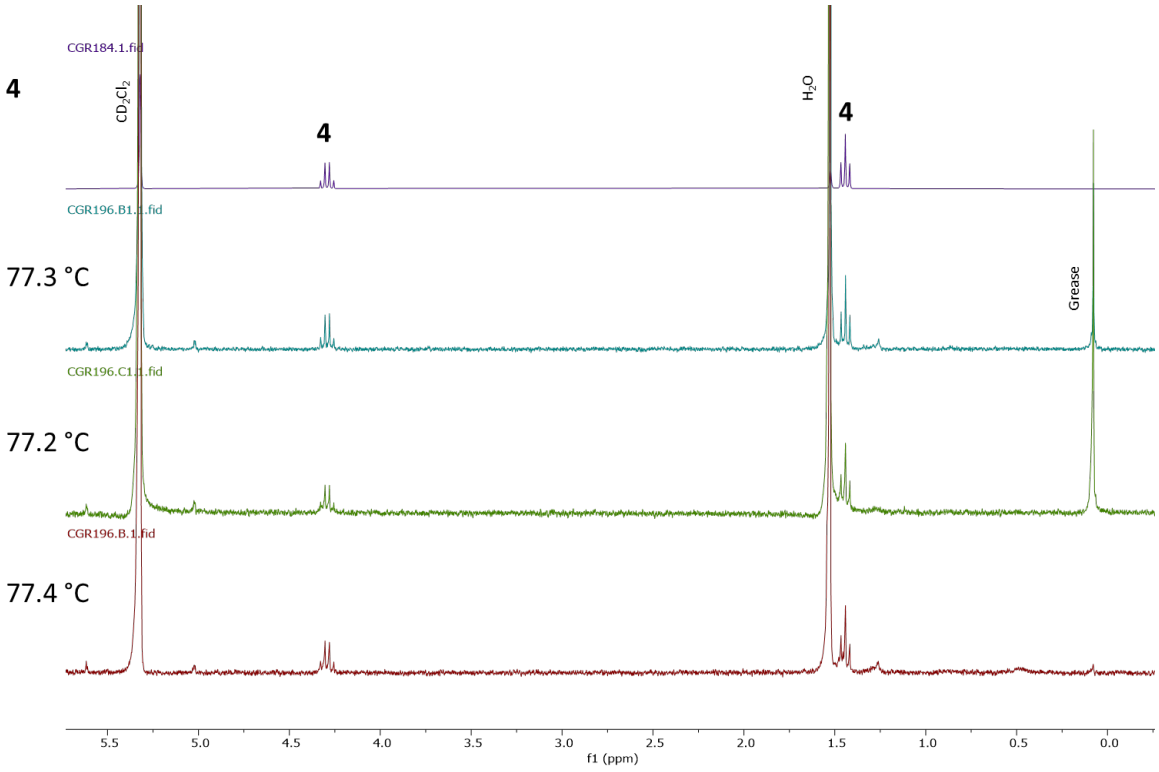
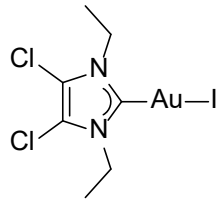


Figure S6: ^{1}H NMR spectra stack plot for **4** and the obtained sublimation materials (400 MHz or 300 MHz, CD_2Cl_2).

5 (Cl,Et)AuI



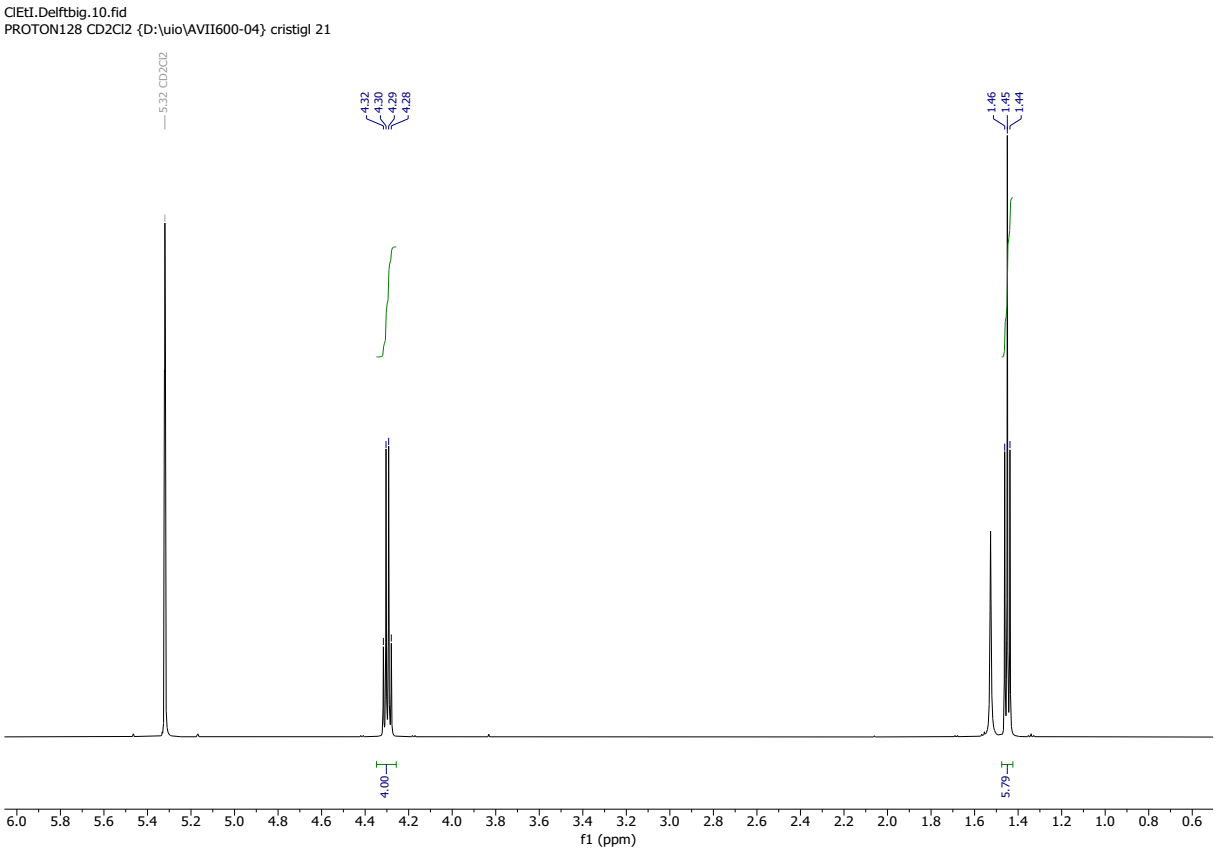


Figure S7: ^{1}H NMR spectrum of **5** (600 MHz, CD_2Cl_2).

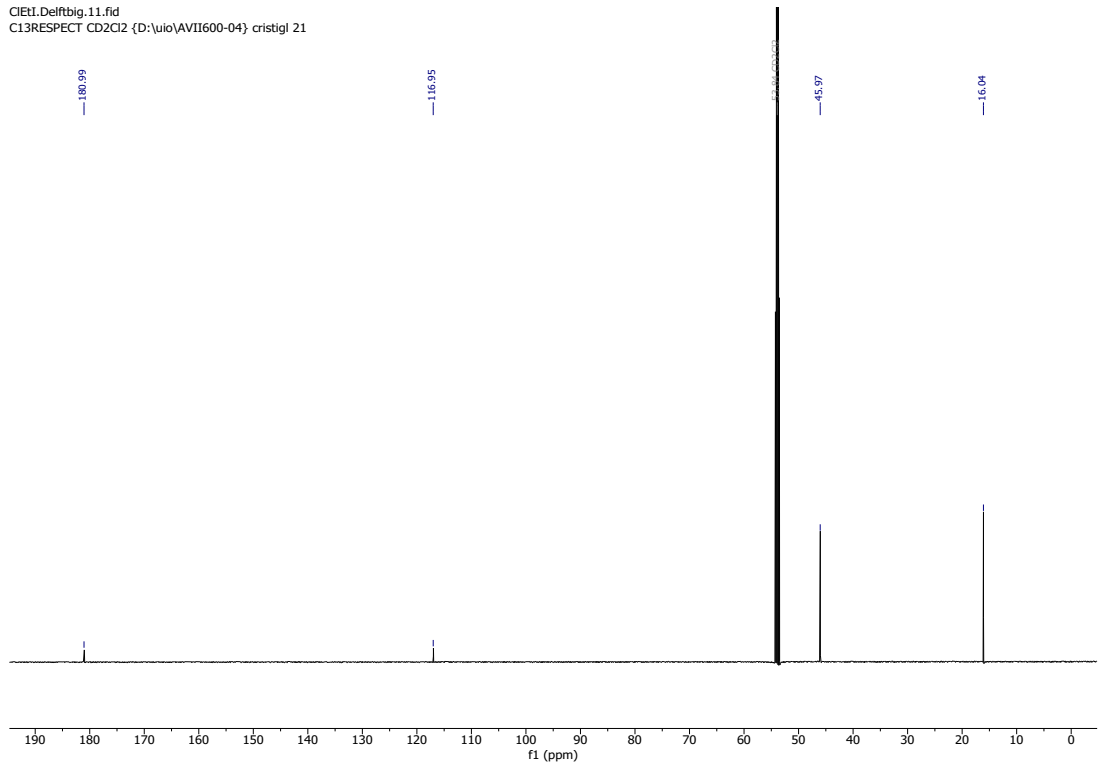


Figure S8: ^{13}C NMR spectrum of **4** (151 MHz, CD_2Cl_2).

Sublimation. From top to bottom in order: **5**, sublimed obtained for three different experiments at a registered temperature of: 73.3 °C, 73.2 °C, 73.3 °C.

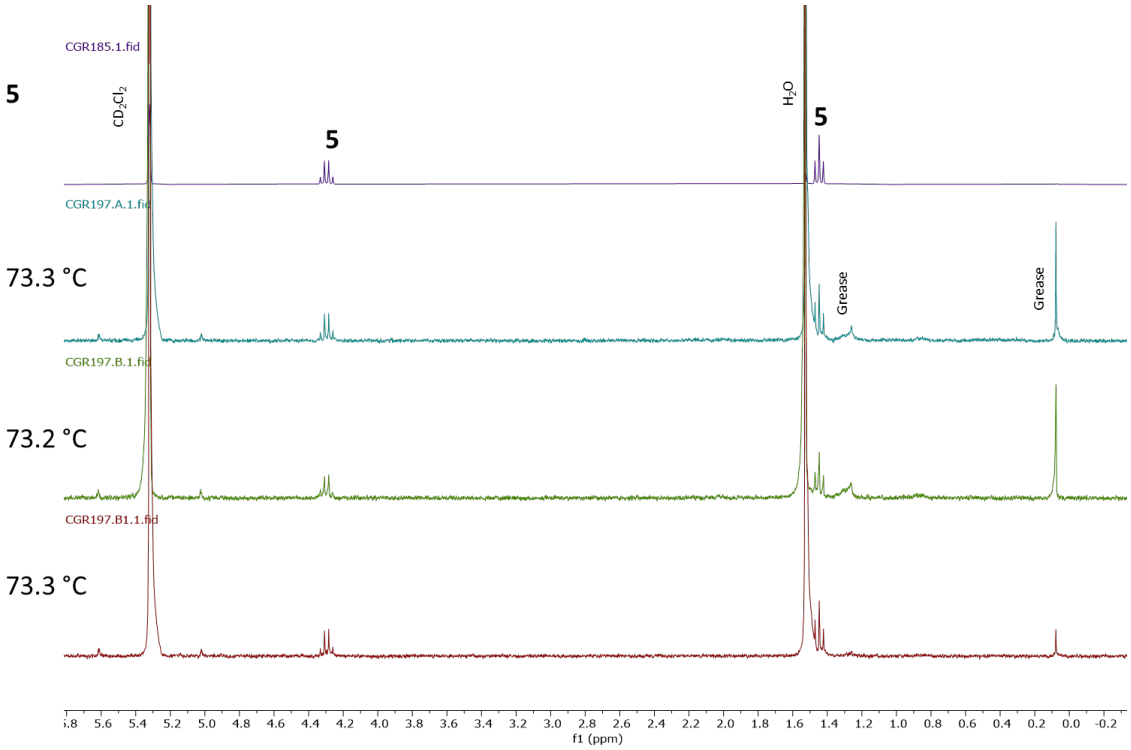
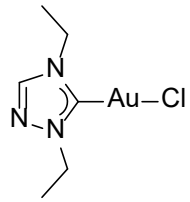


Figure S9: ^{1}H NMR spectra stack plot for **5** and the obtained sublimation materials (400 MHz or 300 MHz, CD_2Cl_2).

6 (N,Et)AuCl



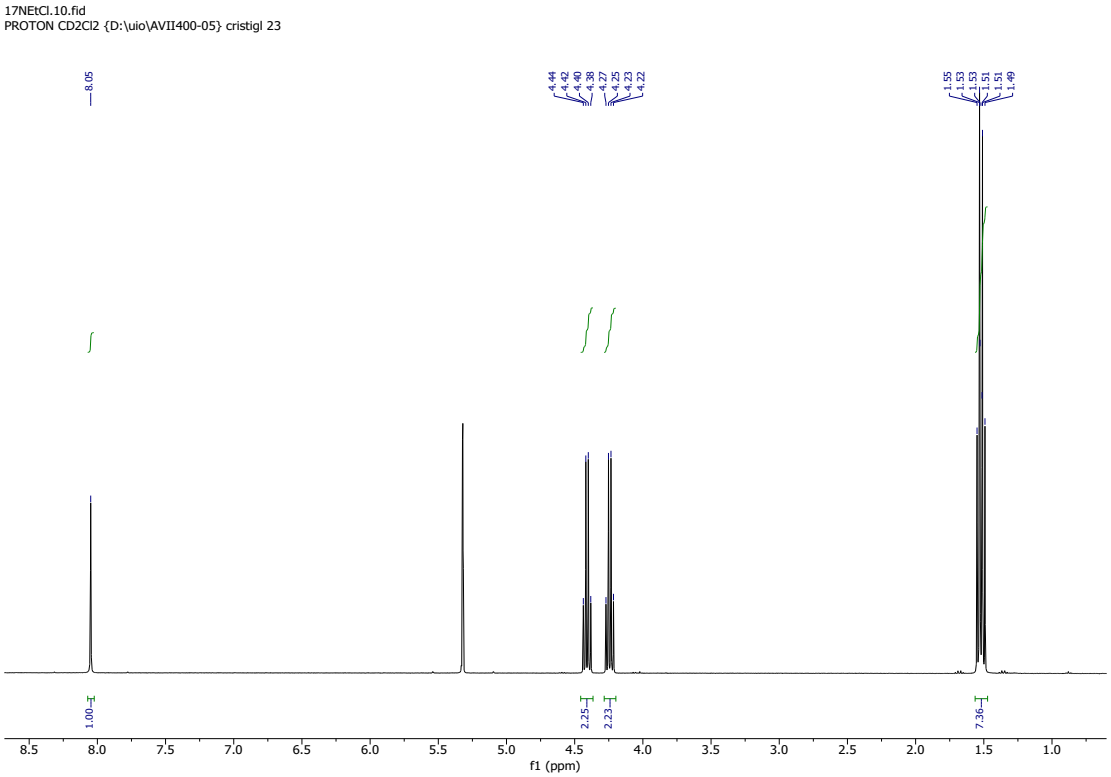


Figure S10: ^{1}H NMR spectrum of 6 (400 MHz, CD_2Cl_2).

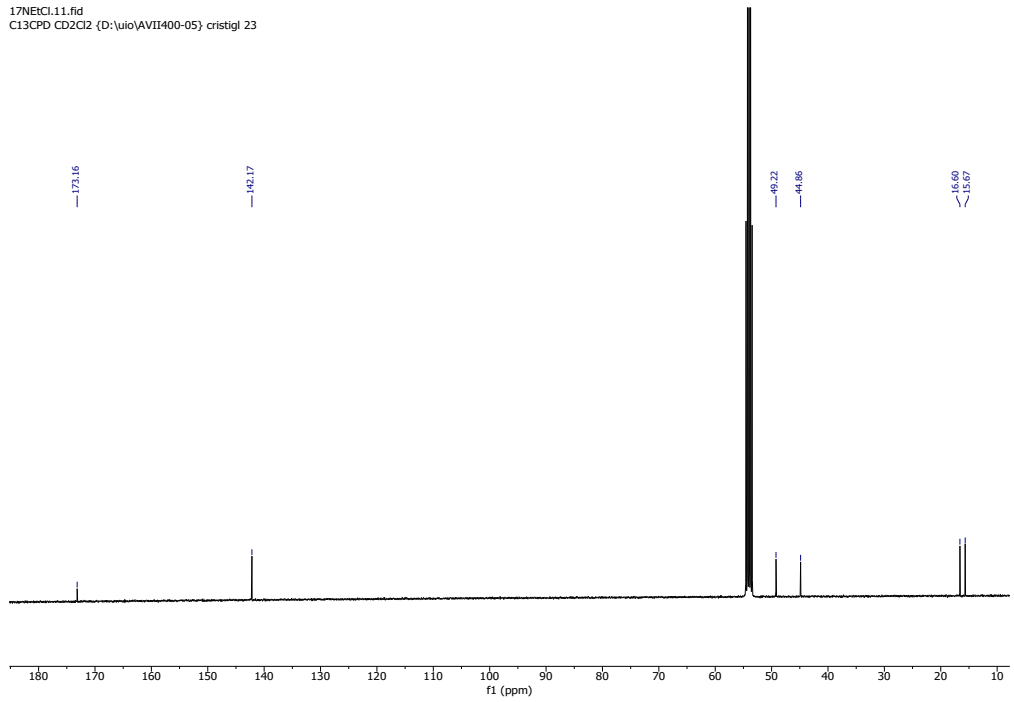


Figure S11: ^{1}H NMR spectrum of **6** (101 MHz, CD_2Cl_2).

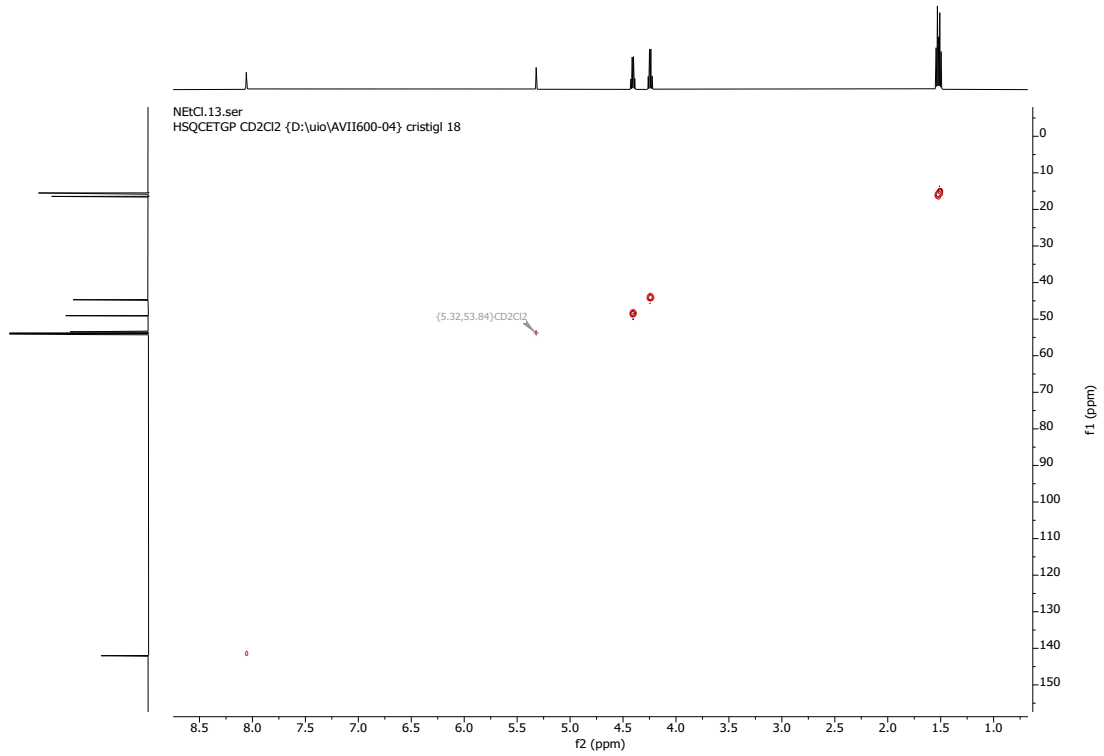


Figure S12: ^{1}H–^{13}C HSQC spectrum of **6** (600 MHz, CD_2Cl_2).

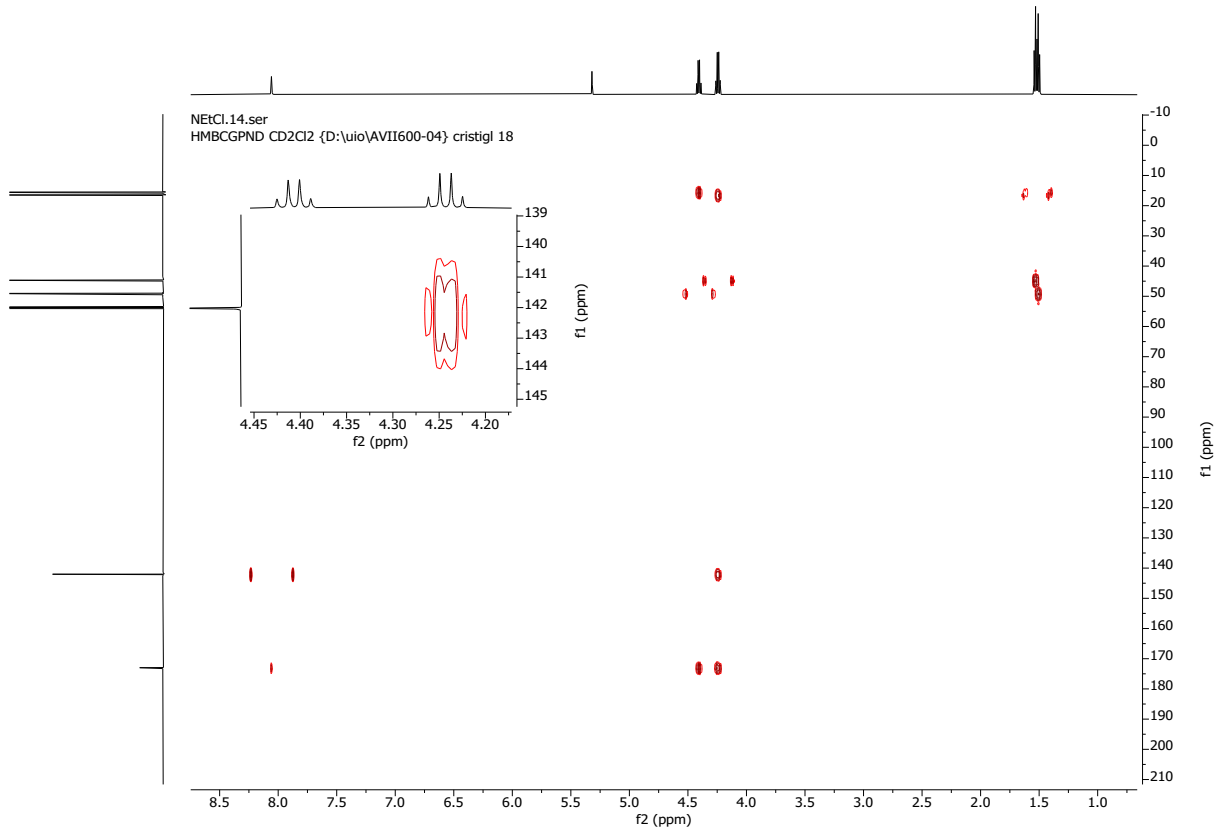


Figure S13: $^{1}H–^{13}C$ HMBC spectrum of **6** (600 MHz, CD_2Cl_2).

Sublimation. From top to bottom in order: **6**, sublimed obtained for three different experiments at a registered temperature of: 60.2 °C, 59 °C, 60.2 °C.

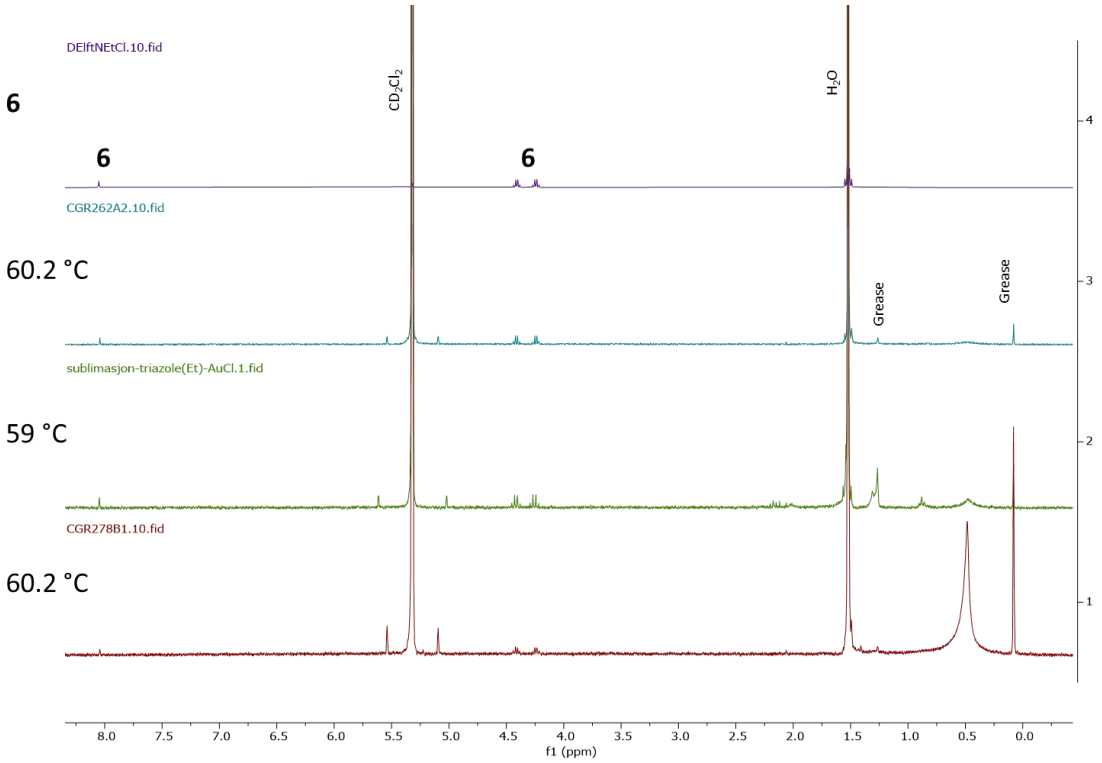
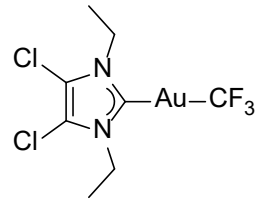


Figure S14: ^{1}H NMR spectra stack plot for **6** and the obtained sublimation materials (400 MHz or 300 MHz, CD_2Cl_2).

7 (Cl,Et)AuCF_3



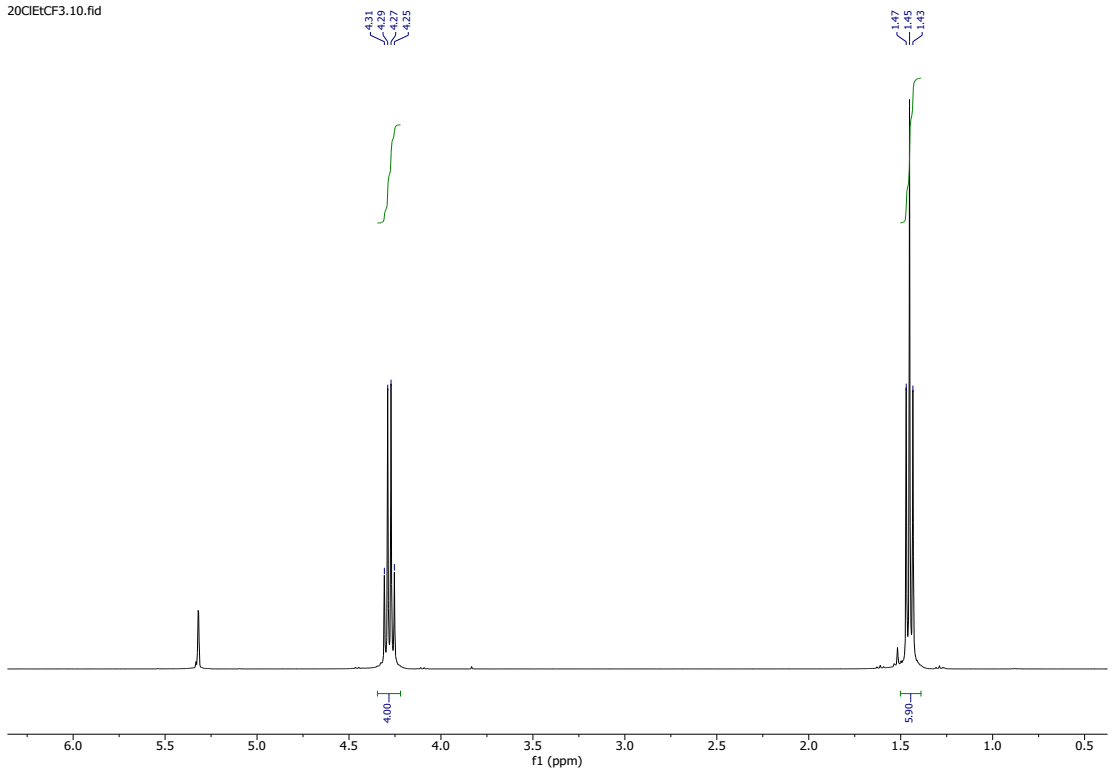


Figure S15: ^{1}H NMR spectrum of **6** (400 MHz, CD_2Cl_2).

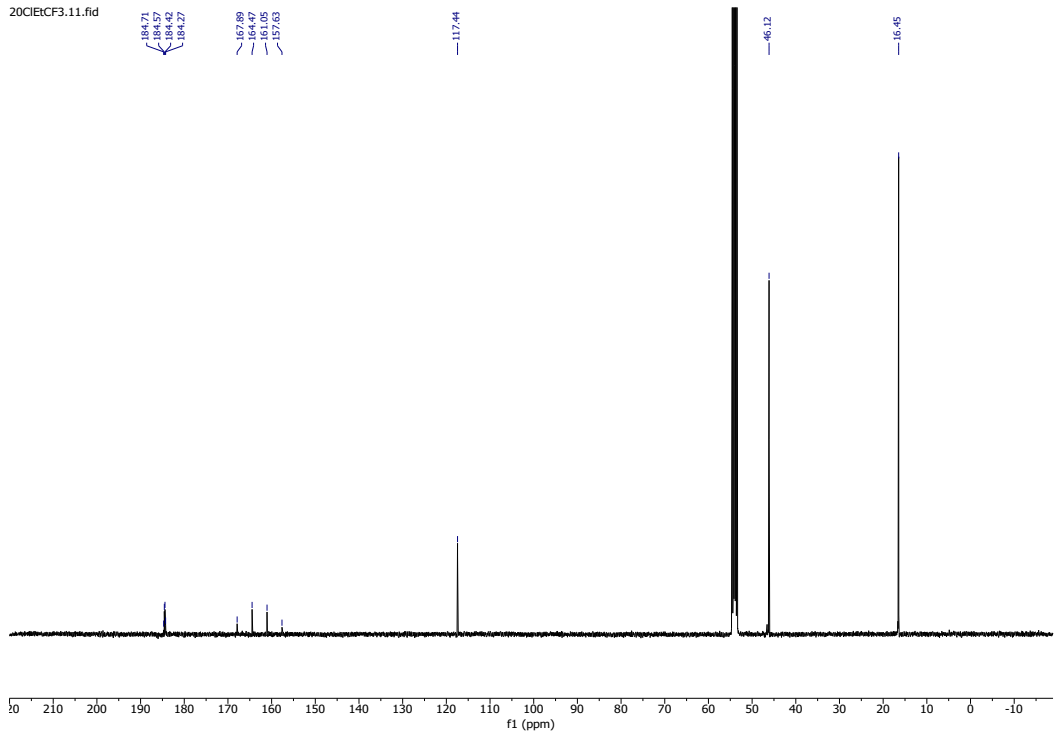


Figure S16: ^{13}C NMR spectrum of **6** (101 MHz, CD_2Cl_2).

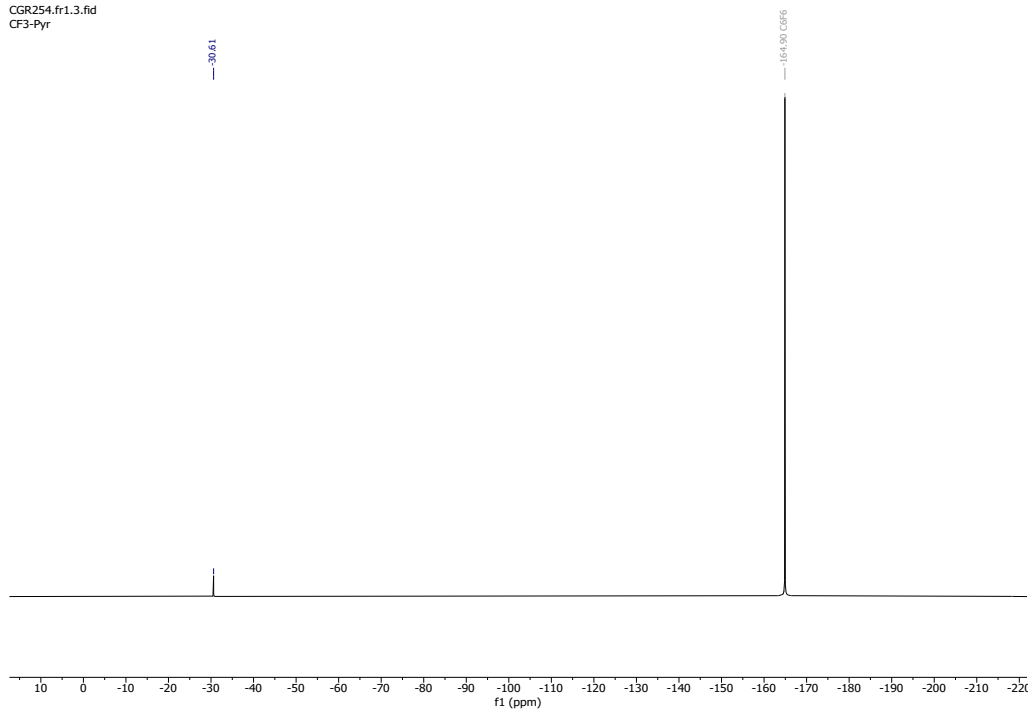


Figure S17: ^{19}F NMR spectrum of **6** (188 MHz, CD_2Cl_2).

Sublimation. From top to bottom in order: **6**, sublimed obtained for three different experiments at a registered temperature of: 54.9 °C, 52.8 °C, 53.1 °C. For the first experiment no heating rate is applied as immediate sublimation is observed.

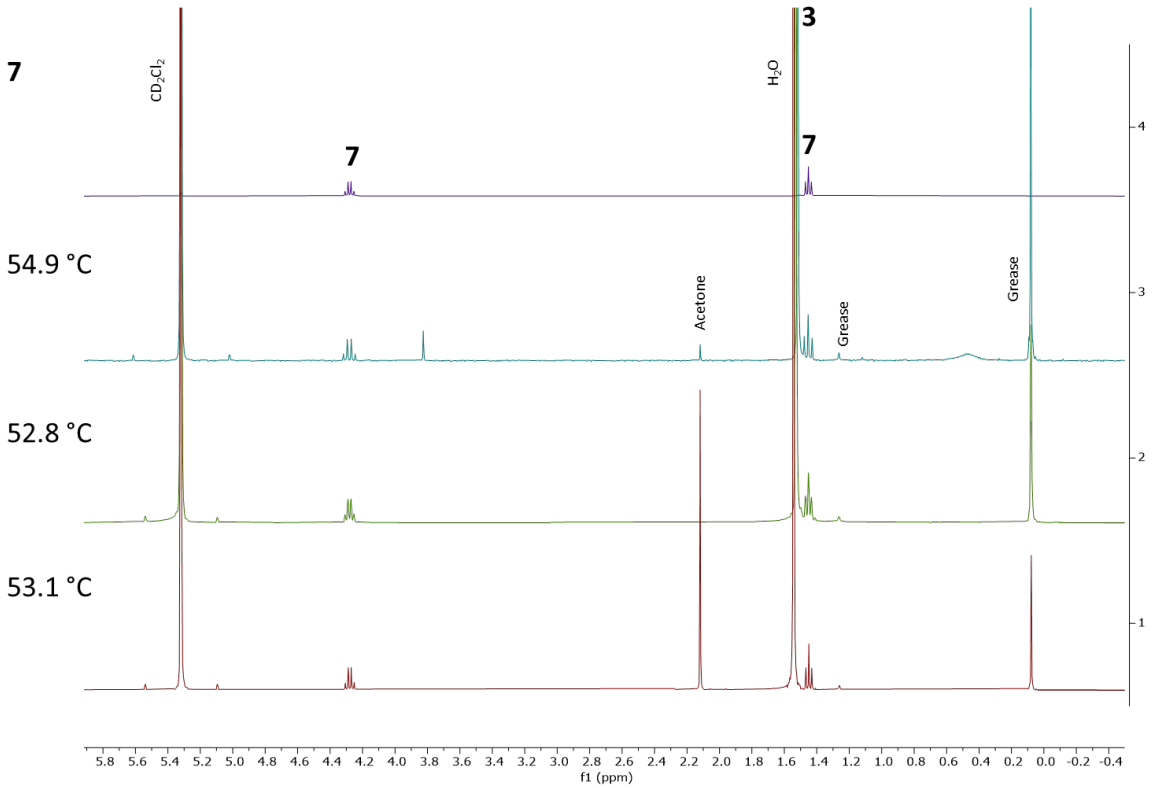


Figure S18: ^{1}H NMR spectra stack plot for **7** and the obtained sublimation materials (400 MHz or 300 MHz, CD_2Cl_2).

Supplemental deposition data for 1–7

Table S1: EDX of 5 performed at 8 keV and 600 pA.

Element	Average	Standard error
C	65.4	0.23
N	10.5	0.23
Au	5.0	0.07
Si	13.4	0.13
O	2.8	0.04
Cl	0.9	0.02
I	2.0	0.05

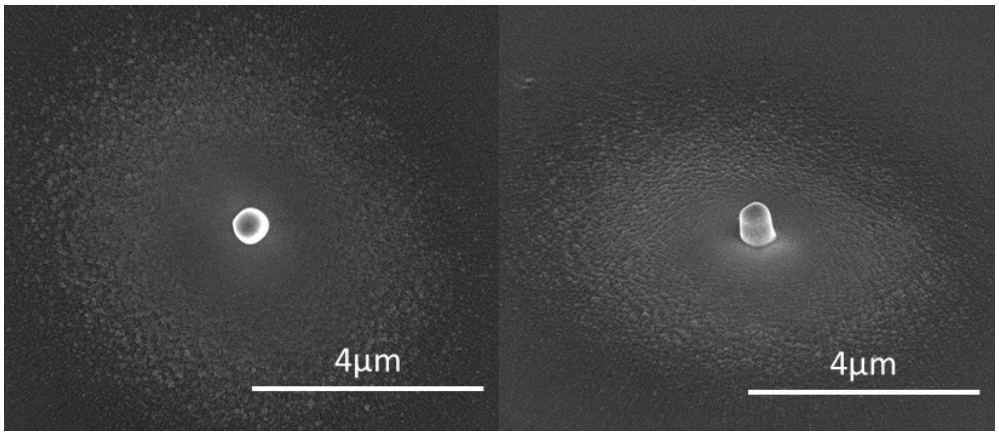


Figure S19: 250 × 250 nm^2 square deposits of **6** at 100 °C, pitch 10 nm, dwell 500 µs, 5 kV, 2000 passes, 600 pA, top down and 50° tilt. A round, very granular halo is visible.

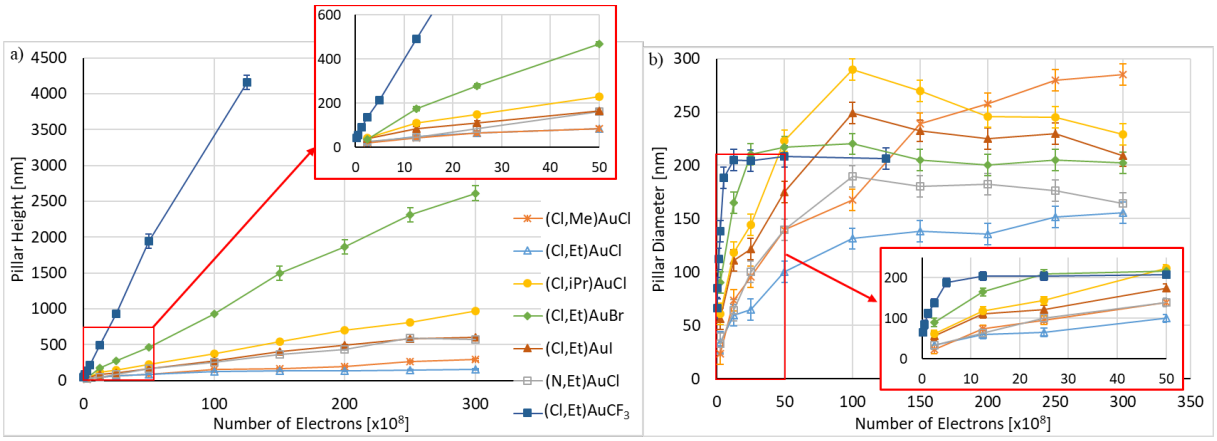


Figure S20: (a) Height and (b) diameter of pillars grown using a 5 kV, 40 pA beam as a function of the electron dose given as total number of primary electrons used to deposit a pillar. During all experiments the substrate and the precursor are heated together to 100 °C, except for (Cl,Me)AuCl, which was heated to 120 °C. For each precursor an array of 3 × 3 pillars was deposited. The lines between the points merely serve as a guide to the guide.