

Supporting Information for

Gold Nanoparticles with Perfluorothiolate Ligands

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- Figure S-2. UV-vis absorbance spectra of fluorinated gold nanoparticles prepared by Brust synthesis in Solkane 365mfc solvent.
- Figure S-3. TEM image of fluorinated nanoparticles prepared by Brust synthesis. TEM was performed on a Hitachi HF-2000, operated at 200 kV. Samples for TEM were prepared by dispersing the MPCs in Solkane 365mfc and drop casting onto grids with an ultrathin carbon film supported by holey carbon (Ted Pella).
- Figure S-4. NMR of the wash liquid (signifying removal of TOABr and disulfide) of as-prepared gold nanoparticles obtained by Brust synthesis
- Figure S-5. ^{19}F COSY confirming ^{19}F NMR assignment of the fluorinated thiol in Fig 2b
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- Figure S-8. Transmission electron microscopy (TEM) images of $\text{Au}_{55}(\text{PPh}_3)_{12}\text{Cl}_6$. Phase contrast images were obtained with a side-entry Phillips CM 12 microscope operating at 120 KeV, of Au MPCs prepared by spreading a droplet of diluted MPC solution ($\sim 1\text{mg}/10\text{ml}$ CH_2Cl_2), drying in air for 20 minutes on standard carbon-coated (20-30 nm) Formvar films on copper grids (400 mesh).
- Figure S-9. Luminescence spectrum of $\text{Au}_{75}(\text{SC}_6\text{F}_5)_{32}$ in CH_2Cl_2 ; the solution was excited at 400 nm where the absorbance is 0.12.

Figure S-10. ^1H NMR spectra of $\text{Au}_{55}(\text{PPh}_3)_{12}\text{Cl}_6$ (a); ligand exchange product $\text{Au}_{75}(\text{SC}_6\text{F}_5)_{32}$ (b); and free pentafluorobenzenethiol (c) in CD_2Cl_2 . Impurities are labeled in the spectra.

Figure S-11. ^{19}F NMR spectra of free pentafluorobenzenethiol (a) and the exchange product $\text{Au}_{75}(\text{SC}_6\text{F}_5)_{32}$ (b) in CD_2Cl_2 . Impurities are labeled in the spectra.

Figure S-1. Expansion of single peak in inset of Figure 1a of fluorinated gold nanoparticle prepared by Brust synthesis.

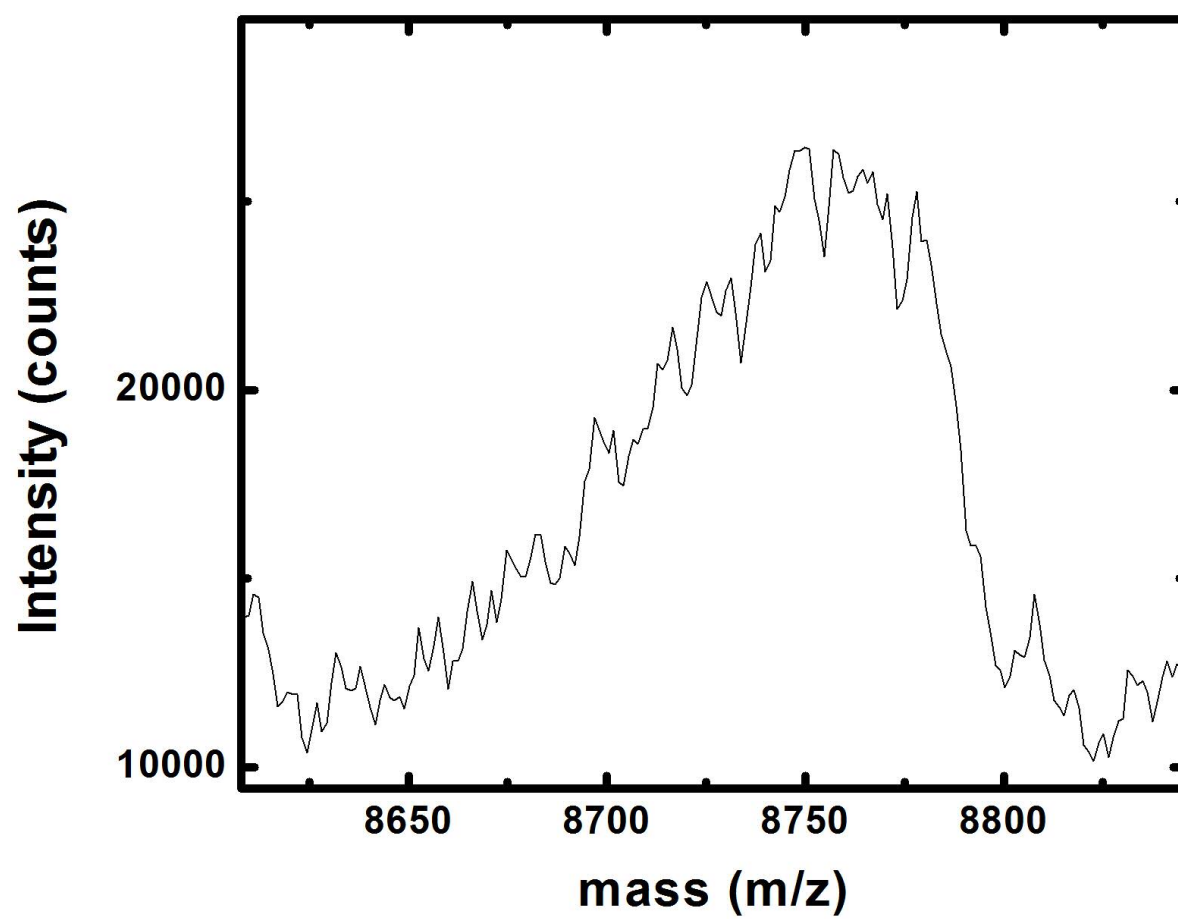


Figure S-2. UV-vis absorbance spectra of the fluorinated gold nanoparticle (B Brust synthesis) in Solkane 365mfc solvent.

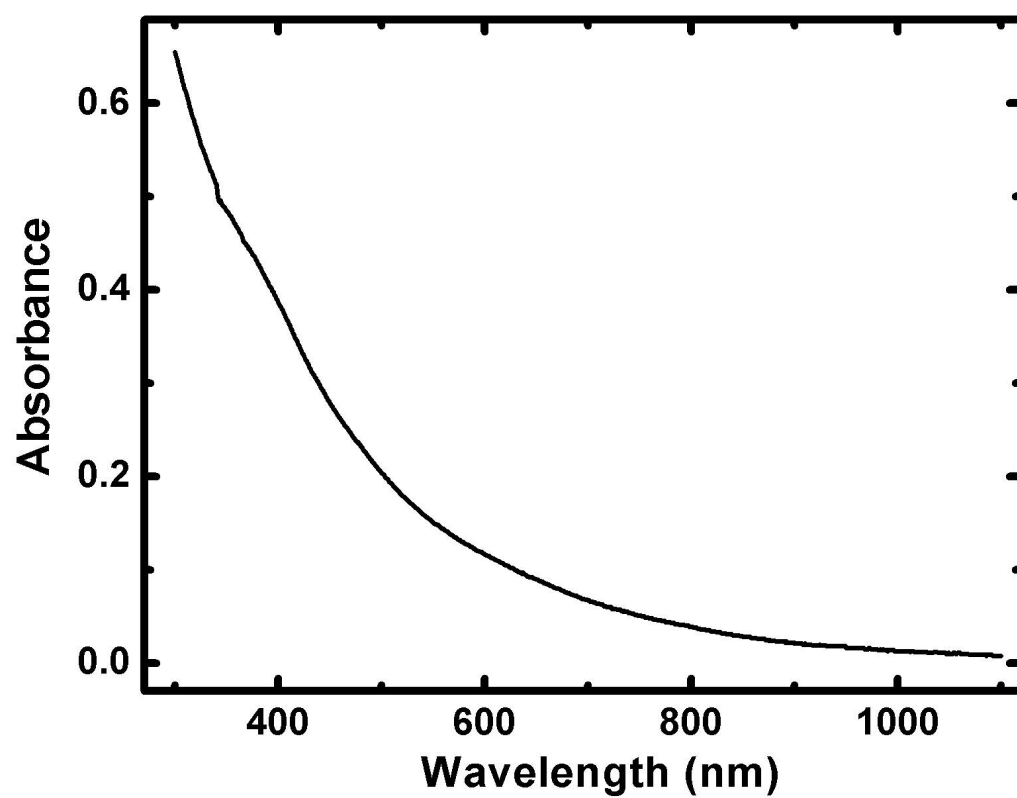


Figure S-3. TEM image of the fluorinated nanoparticle prepared by Brust synthesis. TEM was performed on a Hitachi HF-2000, operated at 200 kV. Samples for TEM were prepared by dispersing the MPCs in Solkane 365mfc and drop casting onto grids with an ultrathin carbon film supported by holey carbon (Ted Pella).

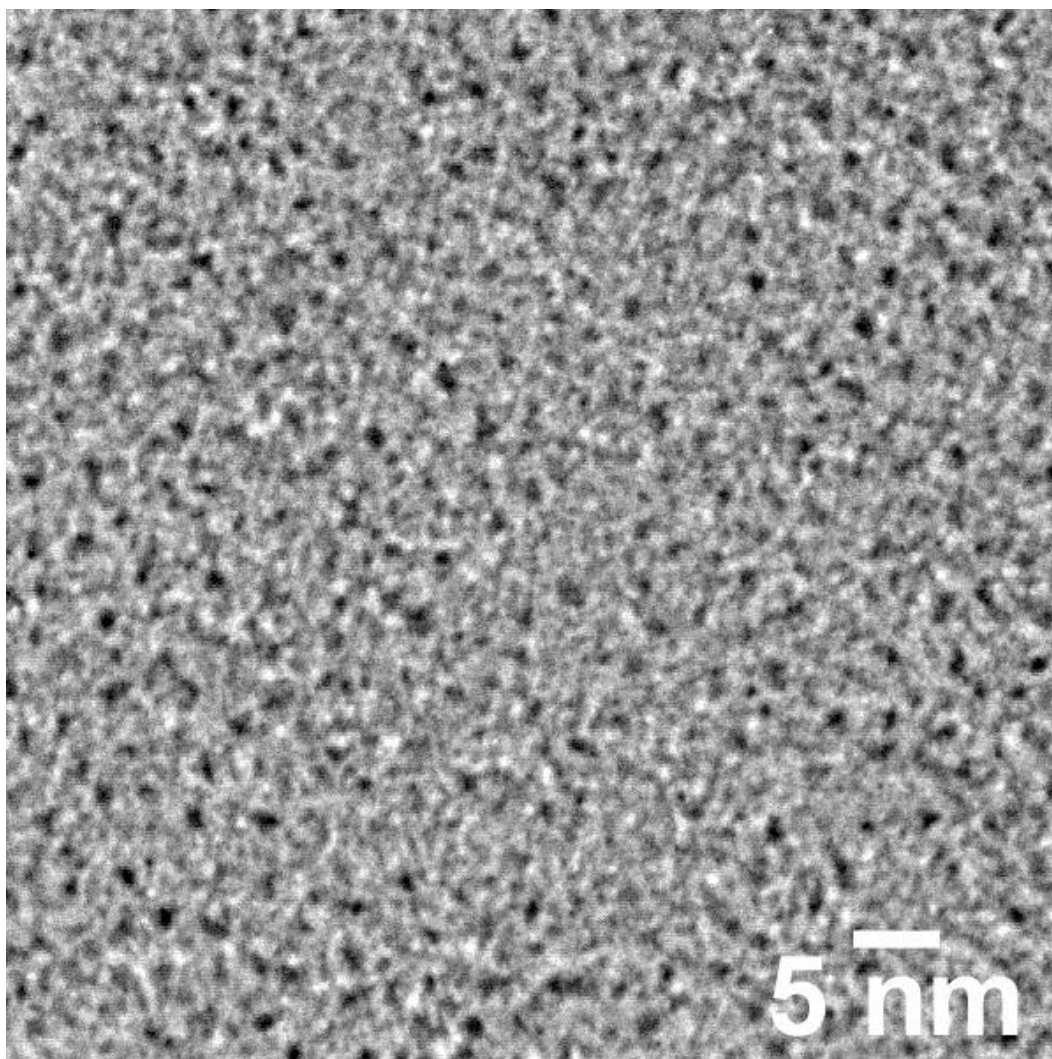
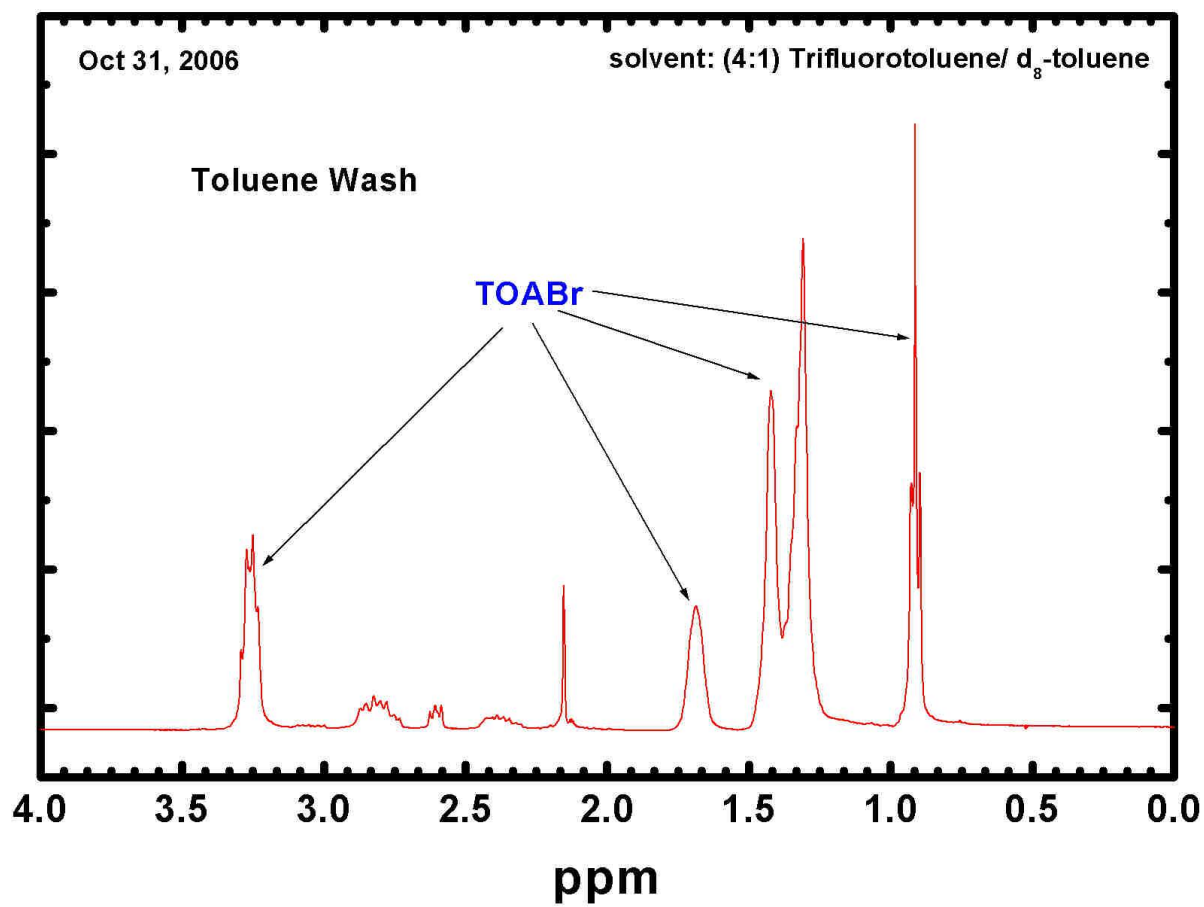


Figure S-4. NMR of the wash liquid (signifying removal of TOABr and disulfide) of the as-prepared gold nanoparticle obtained by Brust synthesis.



STANDARD PROTON PARAMETERS

Data Collected on:
marinet6-inova600
Acquisition directory:
/home/harrisd/vnmr/sys/data
Sample directory:

File: gc05y

Pulse Sequence: gc05y
Solvent: Acetone

Relax. delay 1.000 sec
Acq. time 0.035 sec
Width 34587.1 Hz
2D Width 34587.1 Hz
512 repetitions
512 scans
OBSERVE F1 564.3657991 MHz
DATA PROCESSING
Sine wave 0.017 sec
F1 564.3657991 MHz
F2 500.136099 Hz
Sine bell 0.009 sec
F1 size 8192 x 8192
Total time 18 min

Figure S-6. Cyclic voltammetry of 2mg fluorinated gold nanoparticle (obtained by ligand exchange) in 3ml CH_2Cl_2 with 0.1M Bu_4NClO_4 at 283K.

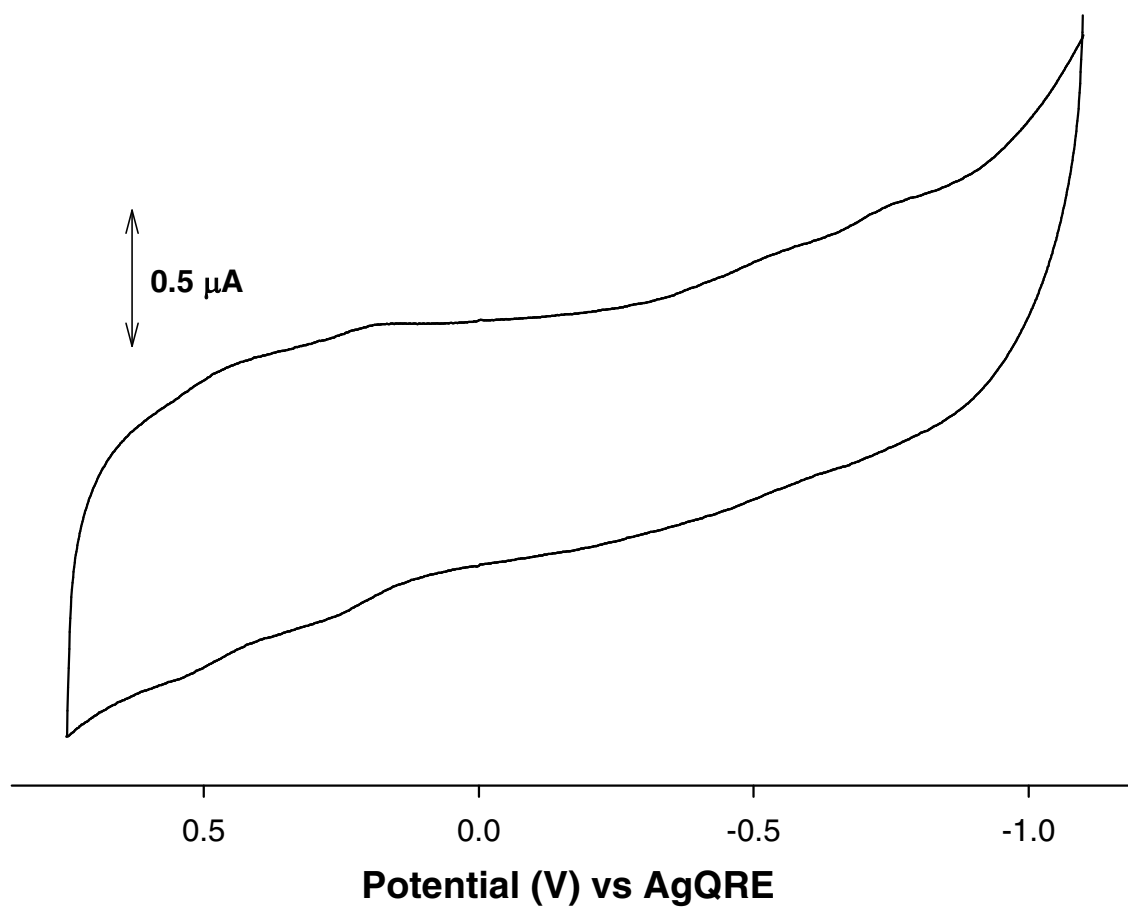


Figure S-7. Thermogravimetric decomposition of fluorinated gold nanoparticle obtained by ligand exchange of $\text{Au}_{55}(\text{PPh}_3)_{12}\text{Cl}_6$ with pentafluorobenzenethiol

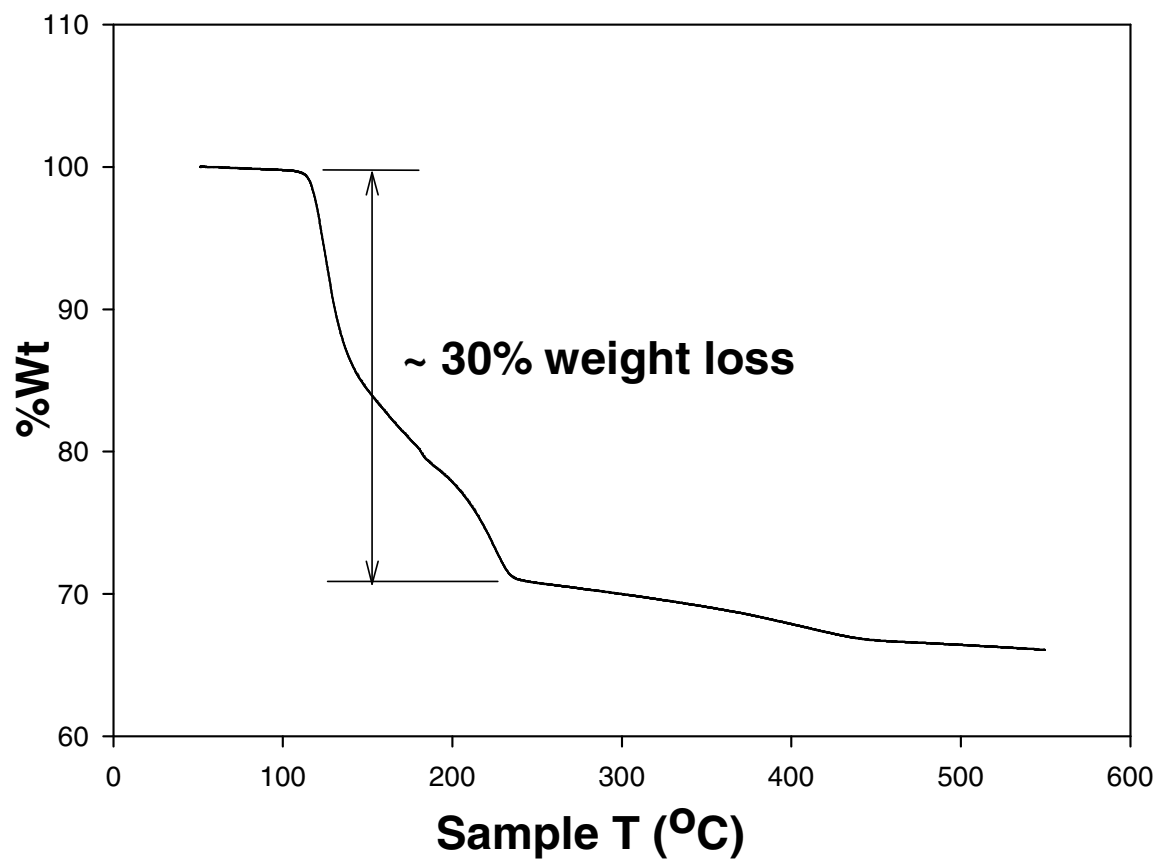


Figure S-8. Transmission electron microscopy (TEM) images of $\text{Au}_{55}(\text{PPh}_3)_{12}\text{Cl}_6$. Phase contrast images were obtained with a side-entry Phillips CM 12 microscope operating at 120 KeV, of Au MPCs prepared by spreading a droplet of diluted MPC solution ($\sim 1\text{mg}/10\text{ ml}$ CH_2Cl_2), drying in air for 20 minutes on standard carbon-coated (20-30 nm) Formvar films on copper grids (400 mesh).

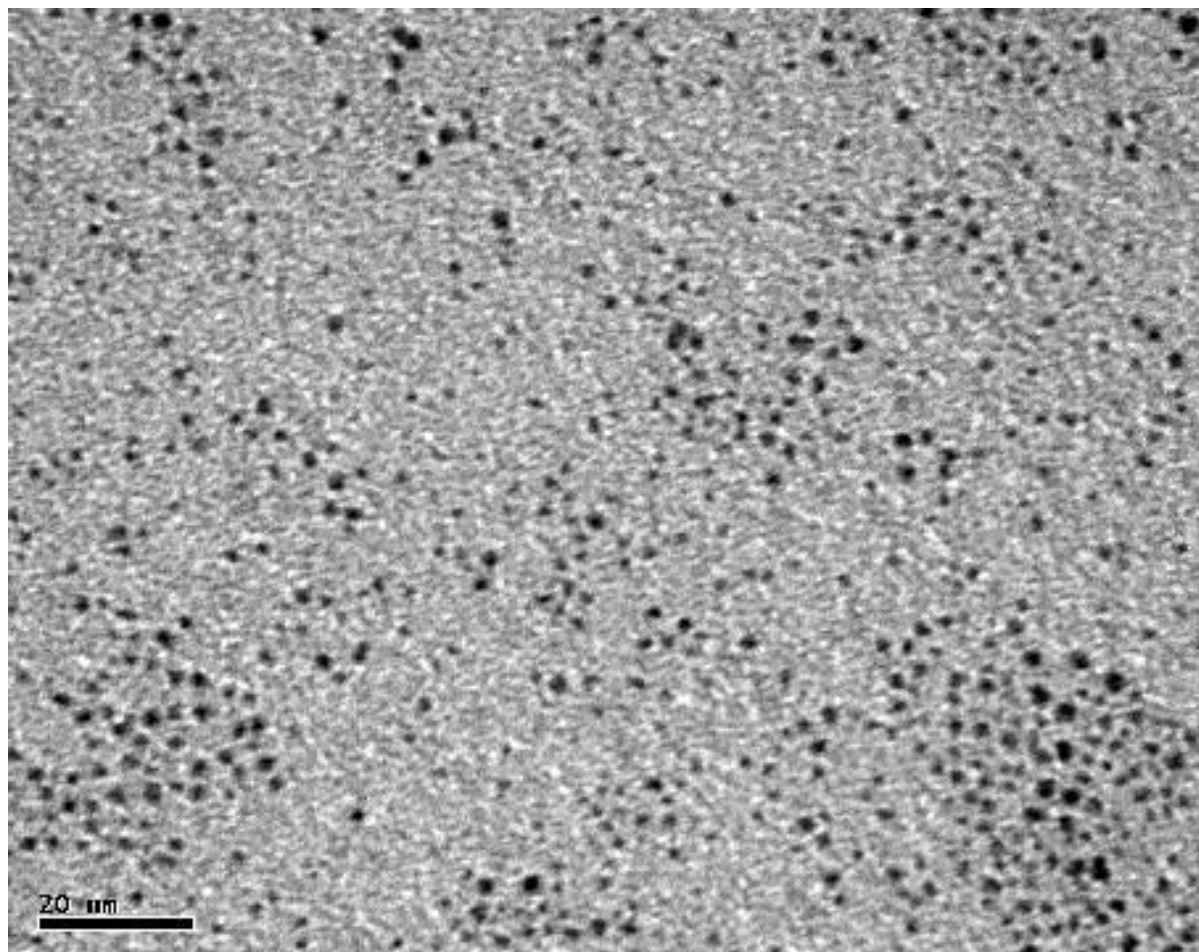


Figure S-9. Luminescence spectrum of $\text{Au}_{75}(\text{SC6F5})_{32}$ in CH_2Cl_2 ; the solution was excited at 400 nm where the absorbance is 0.12.

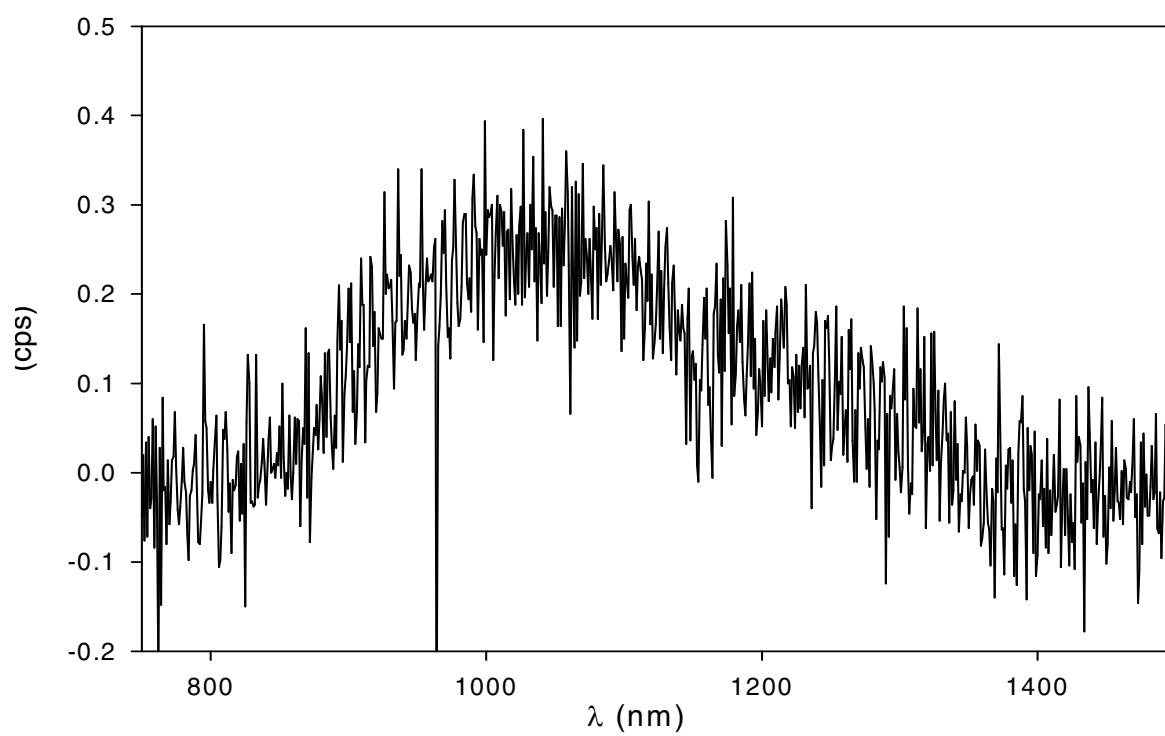


Figure S-10. ^1H NMR spectra of $\text{Au}_{55}(\text{PPh}_3)_{12}\text{Cl}_6$ (a); ligand exchange product $\text{Au}_{75}(\text{SC}_6\text{F}_5)_{32}$ (b); and free pentafluorobenzenethiol (c) in CD_2Cl_2 . Impurities are labeled in the spectra.

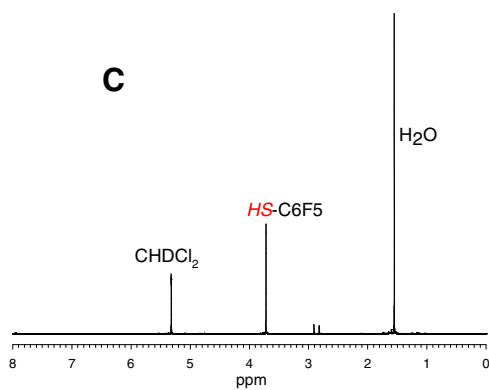
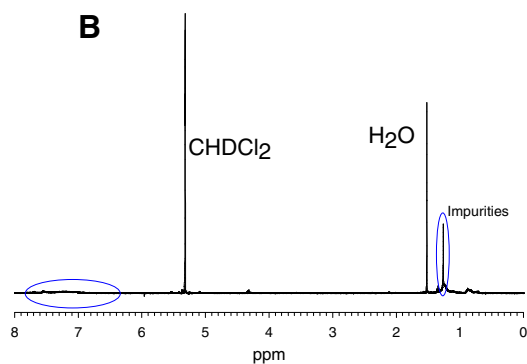
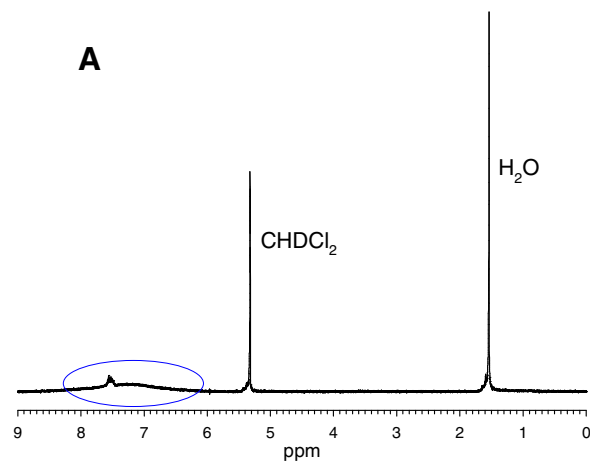


Figure S-11. ^{19}F NMR spectra of free pentafluorobenzenethiol (a) and the exchange product $\text{Au}_{75}(\text{SC}_6\text{F}_5)_{32}$ (b) in CD_2Cl_2 . Impurities are labeled in the spectra.

