Supporting Information

From Langmuir Blodgett to Grafted Films

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10 pages, 13 figures, 2 tables.

Image of the modified Langmuir trough

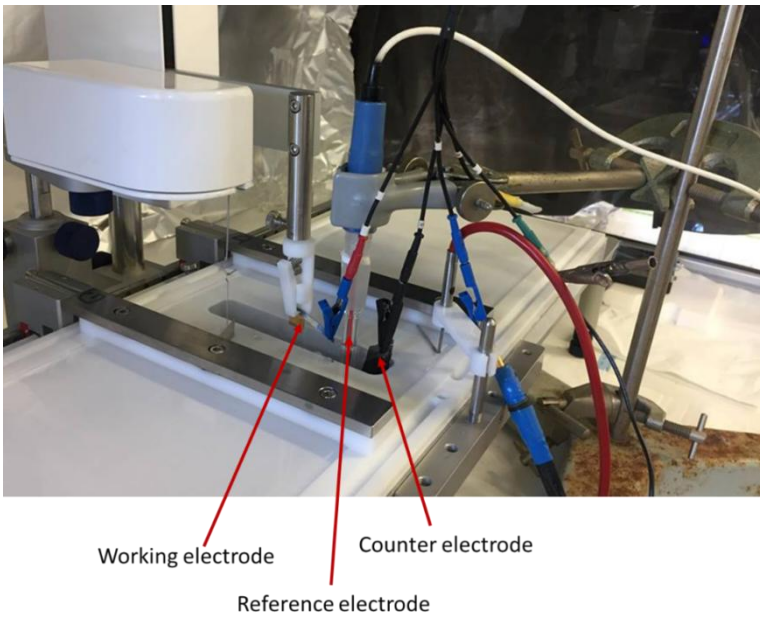


Fig. SI-1: image of the modified Langmuir trough for LB-eG process.

Electrografting of ODA on gold

Electrochemical oxidation of ODA on gold.

We have measured a voltammogram of ODA in different solvents. In ACN (Fig. SI-2) the adsorption of ODA blocks the electrode and reduces the background current.

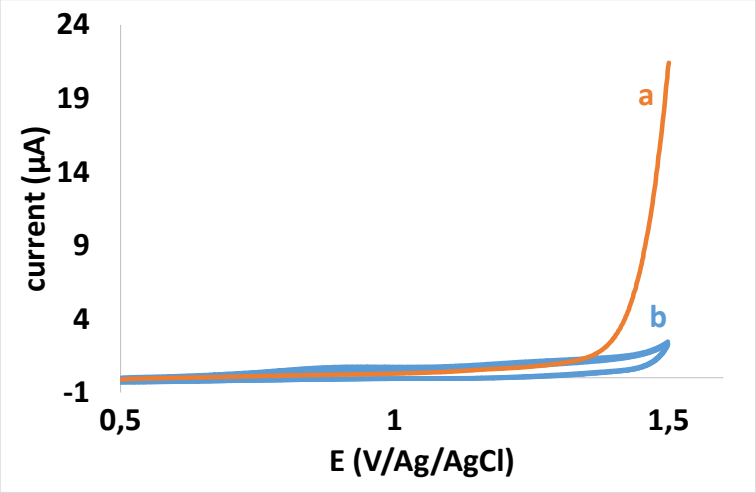


Fig. SI-2: Cyclic voltammogram on an *Au* electrode a) in ACN + 0.1 M NBu_4BF_4 and b) after addition of a nominal concentration c = 1 mM of ODA, scan rate v = 0.1 Vs^{-1}.

ODA is more soluble in DMF; in DMF + 0.1M NBu_4BF_4, the oxidation peak of *Au* is observed at Ep = 1.0 V/(Ag/AgCl); and the oxidation wave of ODA is observed as a broad peak at Ep (ODA) = 1.36 V/SCE, the same potential as butylamine (Fig. SI-3).

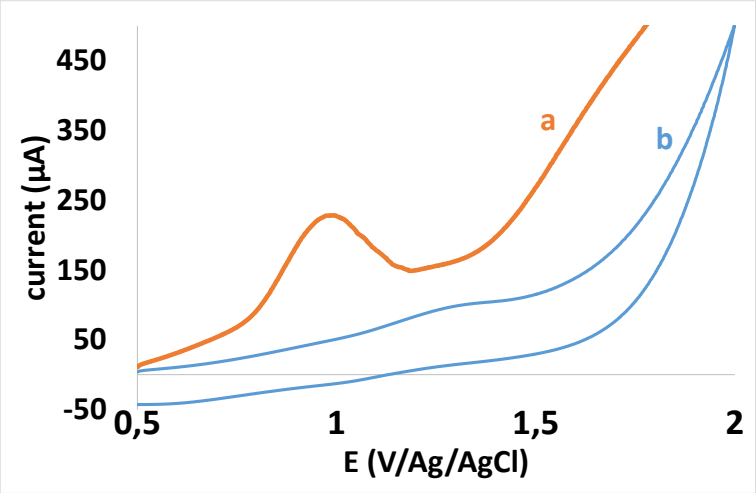


Fig. SI-3: Cyclic voltammogram on an Au electrode a) in DMF + 0.1 M NBu_4BF_4 and b) after addition of ODA (c = 1 mM). Scan rate v = 0.1 Vs^{-1}

We also recorded the background in the same pH 9 solution used for the formation of the Langmuir film. The onset of the background is about + 0.8 V/SCE (Fig. SI-4).

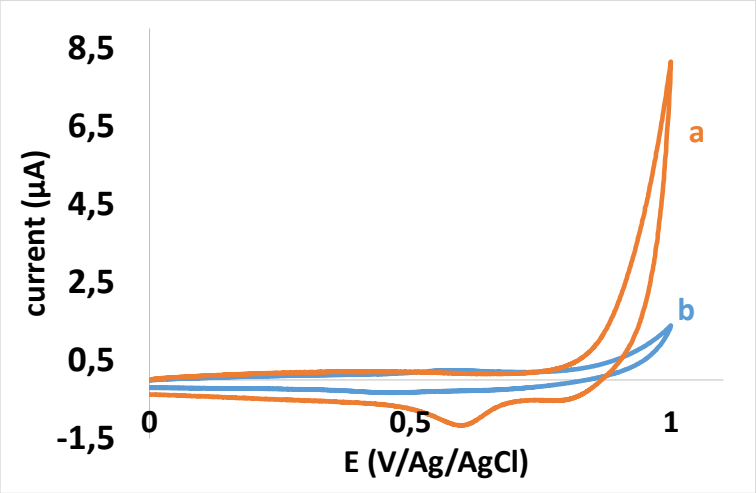


Fig. SI-4: Cyclic voltammogram on an Au electrode a) in a pH 9 solution and b) after addition of ODA (c = 1 mM). Scan rate v = 0.1 Vs^{-1}.

Water contact angle on Au-$ODA_{LB\text{-}G}$.

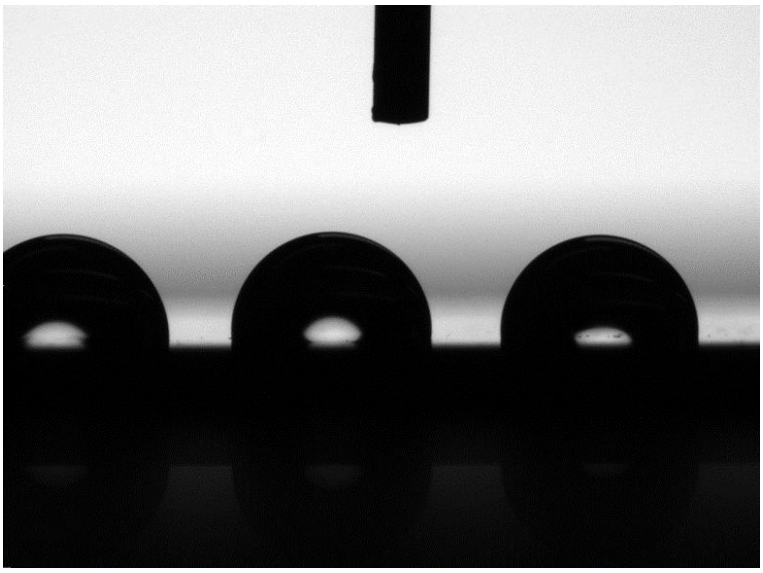


Fig. SI-5: The water contact angle of *Au*-ODA_{LB-G}.

The water contact angle of *Au*-ODA_{LB-G} is 101.3° ± 0.5°.

Infrared Spectrum of Au-ODA_{LB}.

The stability of *Au*-ODA_{LB} film was tested by ultrasonication for 3 min. As shown by the IR spectra in Fig. SI-6, the ODA_{LB} film is mainly desorbed under such conditions. The monolayer dewetting was also confirmed by AFM (data not shown).

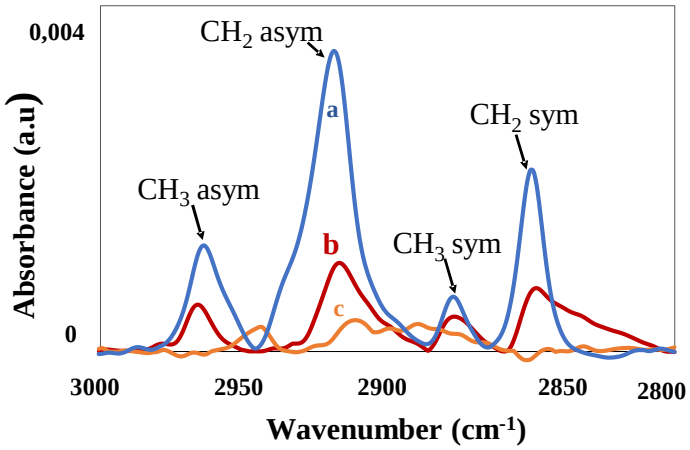
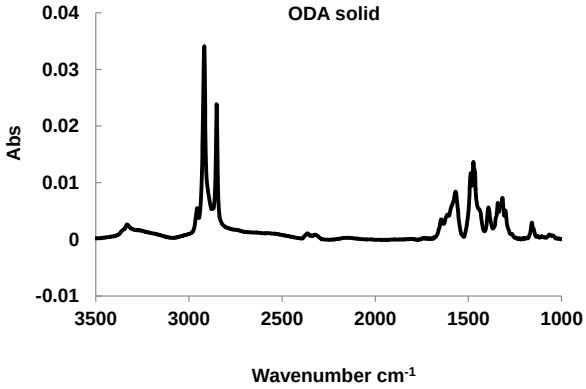
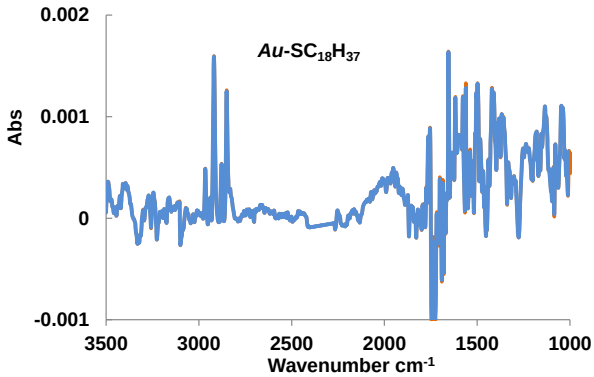
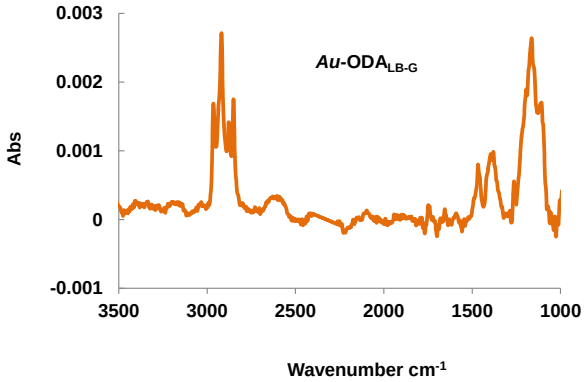


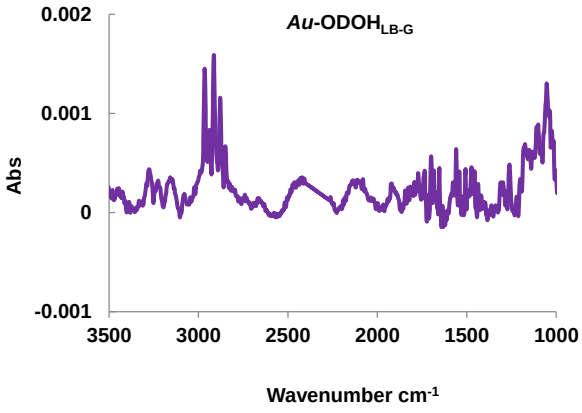
Fig. SI-6: IRRAS spectra of a) *Au*-$SC_{18}H_{37}$, b) *Au*-ODA_{LB} , c) *Au*-ODA_{LB} after ultrasonication.

Infrared Spectra


ODA solid
Abs
0.04
0.03
0.02
0.01
0
-0.01
3500
3000
2500
2000
1500
1000
Wavenumber cm-1


Au-SC18H37
Abs
0.002
0.001
0
-0.001
3500
3000
2500
2000
1500
1000
Wavenumber cm-1


Au-ODALB-G
Abs
0.003
0.002
0.001
0
-0.001
3500
3000
2500
2000
1500
1000
Wavenumber cm-1


Au-ODOHLB-G
Abs
0.002
0.001
0
-0.001
3500
3000
2500
2000
1500
1000
Wavenumber cm-1

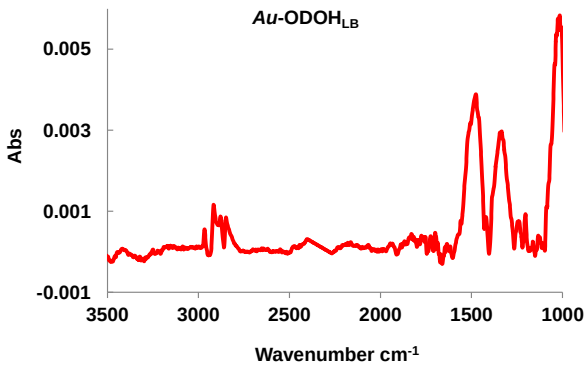


Figure SI-7: Infrared spectra of ODA solid, *Au*-$SC_{18}H_{37}$, *Au*-$ODA_{LB\text{-}G}$, *Au*-$ODOH_{LB\text{-}G}$ and ODA_{LB}.

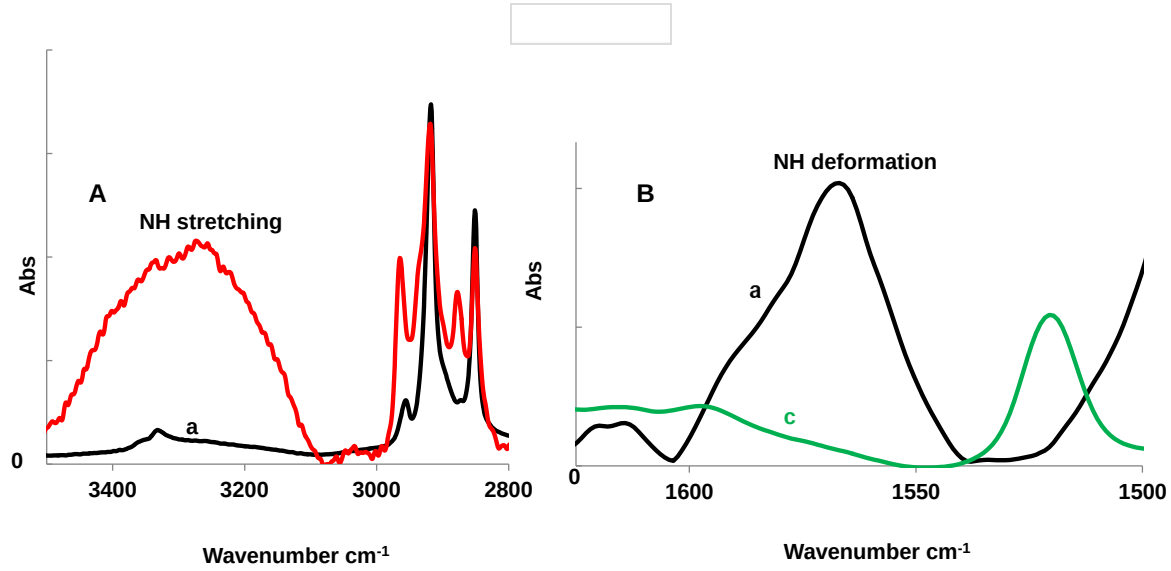


Figure SI-8: A) NH stretching and B) deformations vibrations of a) solid ODA, b) *Au*-$ODA_{LB\text{-}G,\ c)}$ *Au*-$ODA_{LB,}$. Normalized spectra, arbitrary absorbance units.

XPS of Au-$ODA_{LB\text{-}G}$.

Table SI-1 and the spectra (Fig. SI-8) indicate the presence of Au4f in agreement with a thin film, of the nitrogen of ODA with C1s/N1s ~18 as expected from the chemical formula and of a contamination by O1s.

Table SI-1. XPS of *Au*-$ODA_{LB\text{-}G}$.

Atom	Binding Energy (eV)	Atomic proportions %
Au4f	83.9	9.5
C1s	285.2	70.8
N1s	400.4	4.0

O1s	532.6	15.7

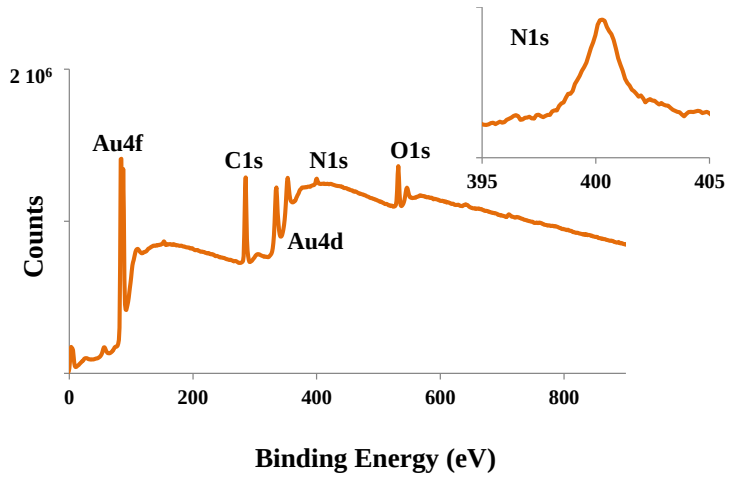


Fig. SI-9: XPS spectrum of *Au*-ODA$_{LB-G}$.

Electrografting of ODOH on gold

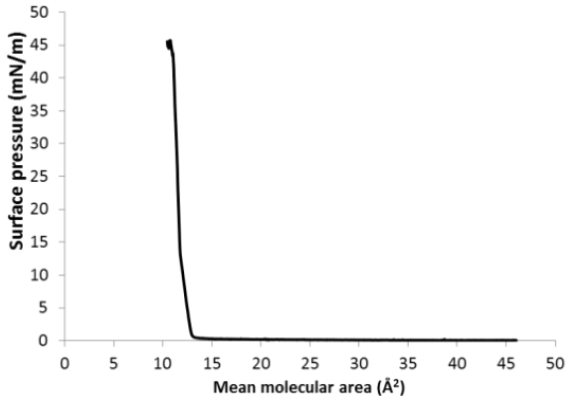


Fig. SI-10: (a) Compression isotherm of ODOH on pH 2 on aqueous solution at 21°C prior to grafting on Au.

Water Contact Angle and thickness of Au-ODOH$_G$.

The water contact angle 95.7° ± 1.4° and the thickness of the film 1.51 nm ± 0.4 nm are similar to that obtained with ODA.

XPS of Au-ODOH$_{LB-G}$.

Table SI-2 and the spectrum (Fig. SI-10) indicate the presence of Au4f in agreement with a thin film. Presence of the oxygen of $ODOH_G$ was detected on the surface but also some oxygen and nitrogen contaminations.

Table SI-2. XPS of *Au*-$ODOH_{LB\text{-}G}$.

Atom	Binding Energy (eV)	Atomic proportions %
Au4f	83.9	33.8
C1s	285.2	51.6
N1s	400.4	1.0
O1s	532.6	13.6

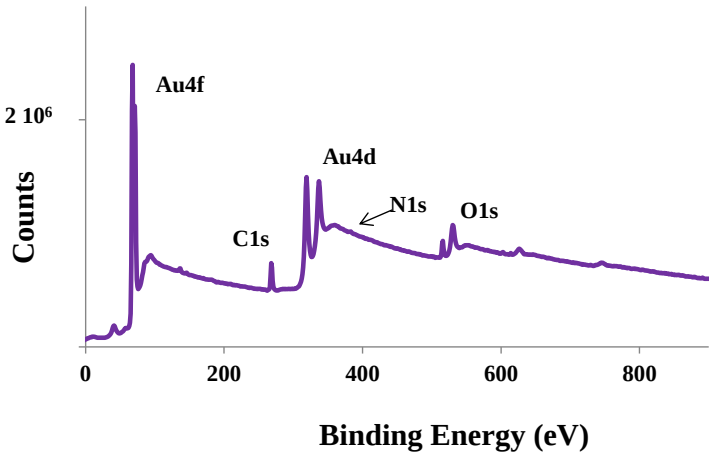


Fig. SI-11: XPS spectrum of *Au*-$ODOH_{LB\text{-}G}$.

AFM images of Au-$ODOH_{LB\text{-}G}$.

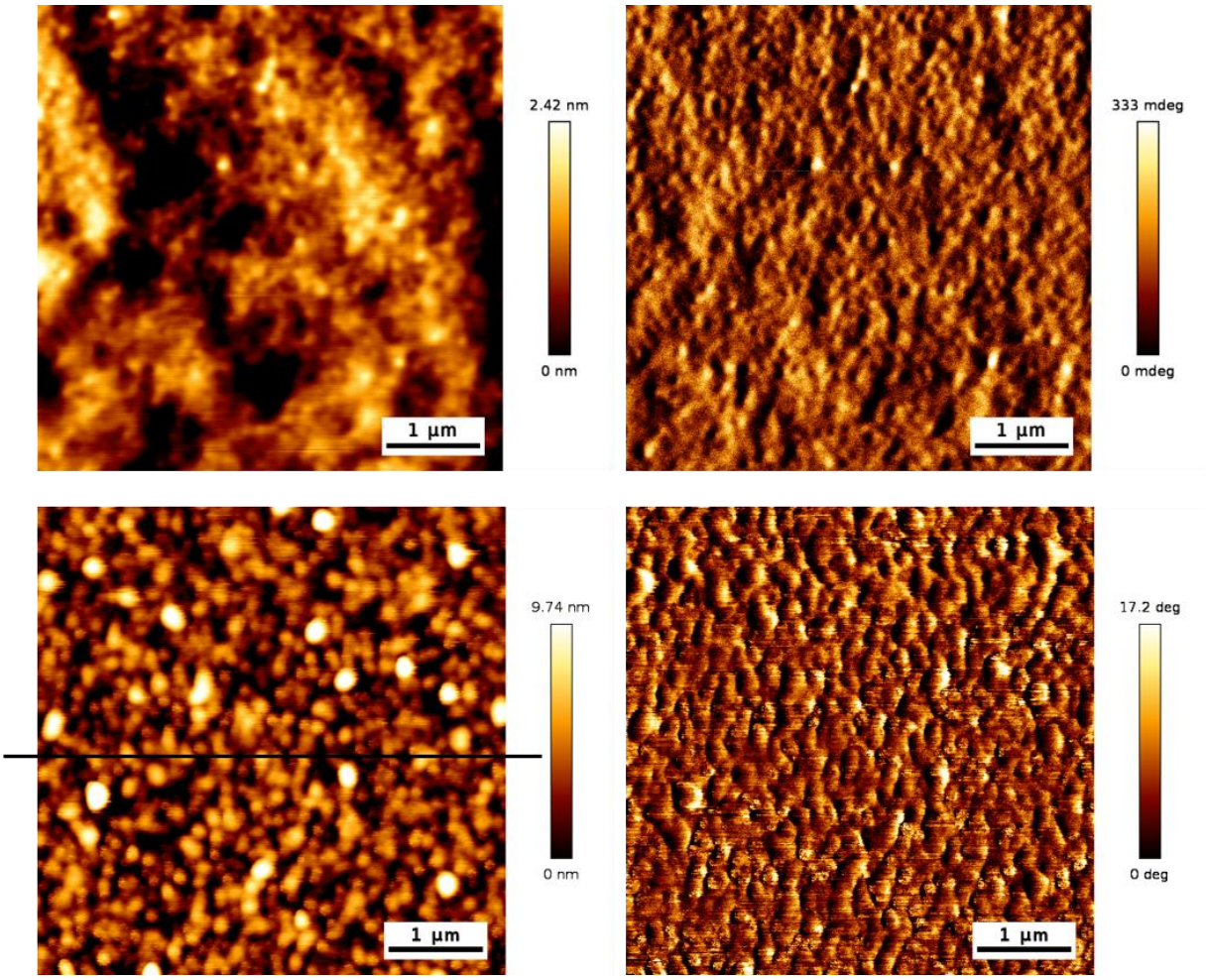


Fig. SI-12: AFM images of *Au*-$ODOH_{LB\text{-}G}$.

Fig. SI-11 presents AFM height (left) and phase (right) images of (upper images) bare *Au* surface before LB-eG process of ODOH and of (lower images) *Au*-$ODOH_{LB\text{-}G}$ after ODOH LB-eG process on Au surface. The surface appears very rough after transfer: numerous small round shaped aggregates with 3 to 5 nm heights cover the gold surface. Among them, some are higher, up to 10 nm height.

IRRAS of Au-ODOH$_{LB-G}$.

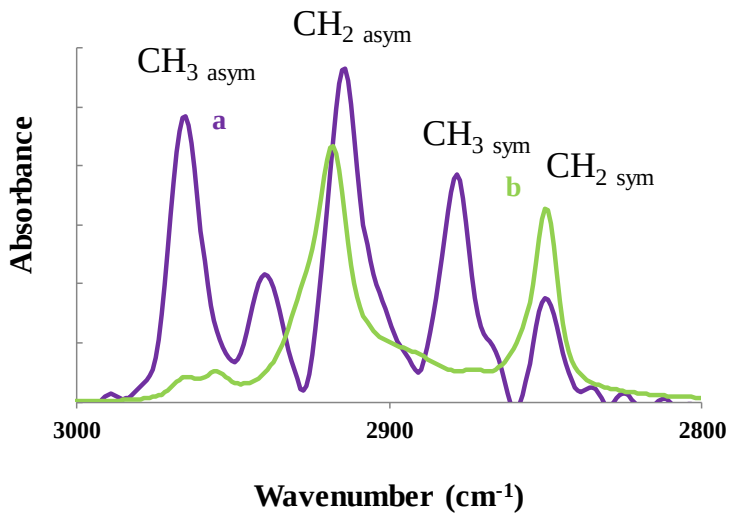


Fig. SI-13: IRRAS spectra of a) *Au*-ODOH$_{LB-G}$, b) *Au*-ODOH solid. Normalized spectra, arbitrary absorbance units.