*Supplementary material for the paper*

# XPS and ARXPS for Characterizing Multilayers of Silanes on Gold Surfaces

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Table S1 Parameters used for the calculation of the relative sensitivity factors of the C 1s, Cl 2p, O 1s, S 2p, Si 2p, N 1s signals for M-gold samples and A-gold samples

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| --- | --- | --- | --- | --- | --- |
|  | Element | Scofield photoionization cross-section (σ) [units of 13600 barns13] | Asymmetry factor | Inelastic mean free-path (λ) [nm] | Intensity/energy response function |
| MPTMS (Overlayer) | C 1s C-Si | 1 | 1.278 | 3.016 | 0.866 |
| C 1s C-S | 1 | 1.278 | 3.015 | 0.866 |
| C 1s Methoxy | 1 | 1.278 | 3.013 | 0.866 |
| O 1s Si-O-Si | 2.93 | 1.278 | 2.687 | 0.911 |
| S 2p | 1.677 | 1.159 | 3.164 | 0.842 |
| Si 2p | 0.817 | 1.140 | 3.237 | 0.830 |
| APTES (Overlayer) | C 1s C-Si | 1 | 1.278 | 3.016 | 0.797 |
| C 1s C-S | 1 | 1.278 | 3.015 | 0.798 |
| C 1s Methoxy | 1 | 1.278 | 3.013 | 0.798 |
| C 1s Carbamate | 1 | 1.278 | 3.01 | 0.799 |
| O 1s Si-O-Si | 2.93 | 1.278 | 2.687 | 0.862 |
| S 2p | 1.677 | 1.159 | 3.164 | 0.764 |
| Si 2p | 0.817 | 1.140 | 3.237 | 0.747 |
| N 1s | 1.8 | 1.278 | 2.867 | 0.828 |



Figure S1 example of angle signature acquired on Ag 3d5/2 peak at 150 eV pass energy

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Figure S2 Example of survey spectrum of freshly cleaved gold sample

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Figure S3 Example of survey spectrum of M-gold sample

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Figure S4 Example of survey spectrum of A-gold sample



Figure S5 Angle-resolved high-resolution spectra of the Au 4f, C 1s, O 1s, S 2p and Si 2p of M-gold samples.



Figure S6 Apparent concentration (%) versus emission angle (a) and relative depth plot (b) for M-gold. (Inset: apparent concentration of gold (at%) versus emission angle) .



Figure S7 1Angle-resolved high-resolution spectra of the Au 4f, C 1s, O 1s, S 2p and Si 2p of A-gold samples