Supporting Information

Oxidation of an organic adlayer - a bird's eye view

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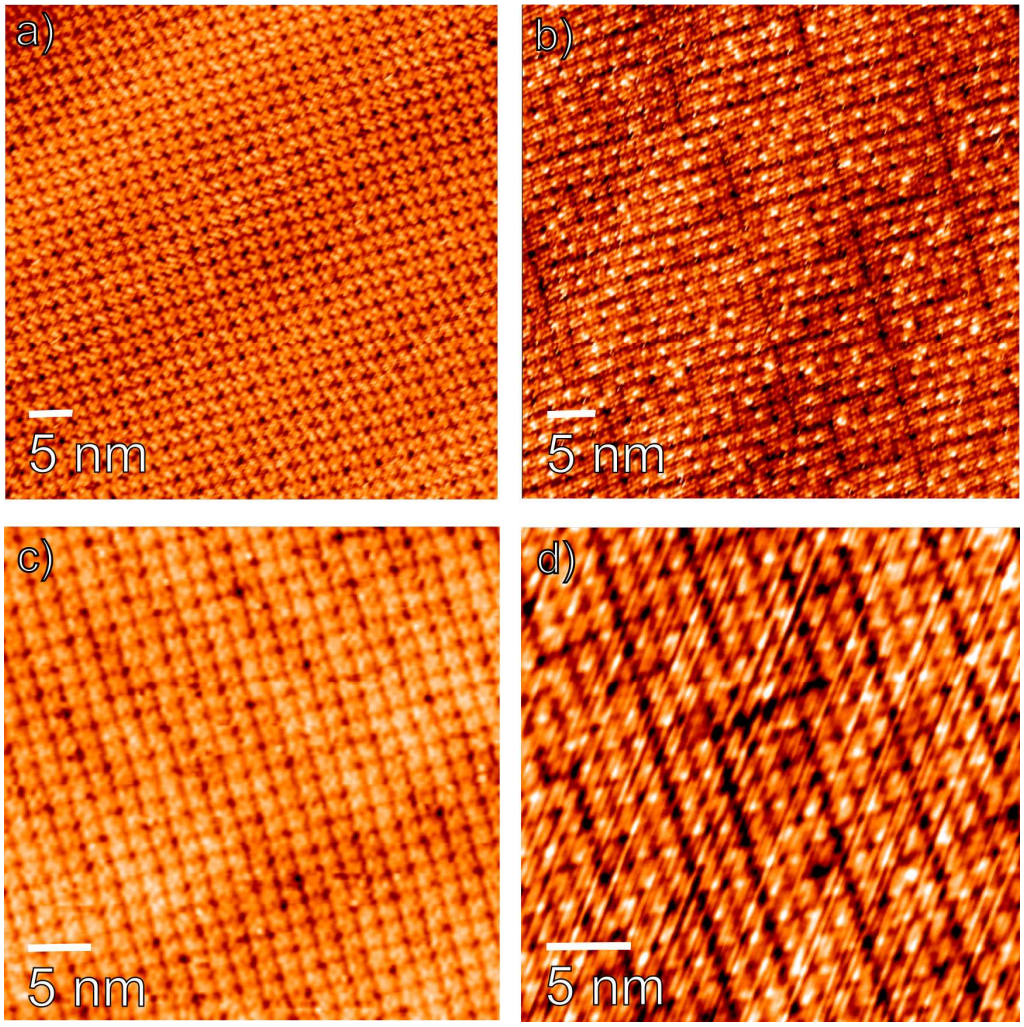

Figure S1 Large scale STM images

a) α- phase on Ag(111) (48 x 48 nm^2, 154 s $frame^{-1}$, I_T = 60 pA, U_T = -2.29 V)

b) α'-phase on Ag(111) (45 x 45 nm^2, 176 s $frame^{-1}$, I_T = 70 pA, U_T = -1.96 V)

c) α-phase on Ag films (36 x 36 nm^2, 100 s $frame^{-1}$, I_T = 5 pA, U_T = -2.20 V)

d) α'-phase on Ag films (28 x 28 nm^2, 100 s $frame^{-1}$, I_T = 15.8 pA, U_T = -2.25V).

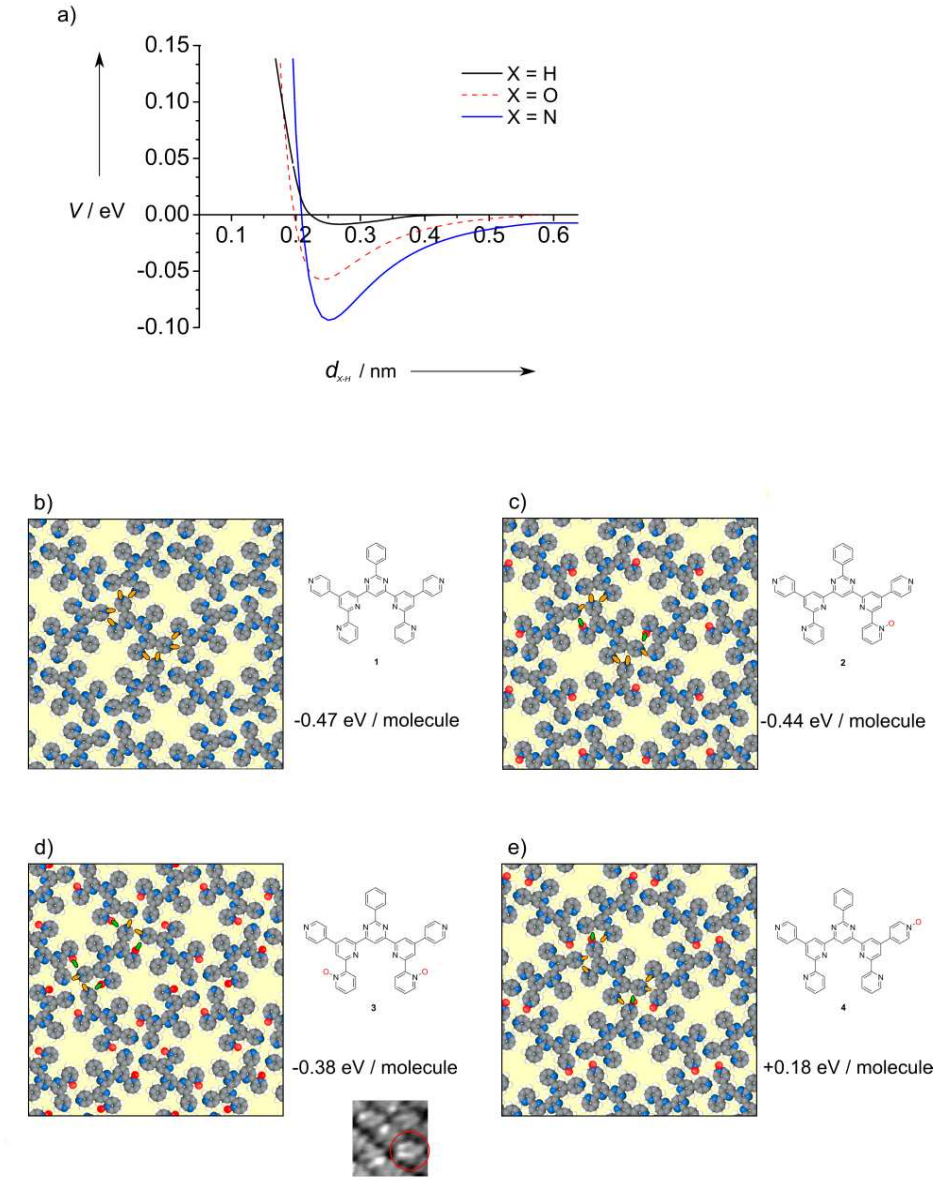

Figure S2

a) MP2 (6-31G(d,p)) based O···H (calculated in this work), N···H-C[15] and C-H···H-C[15] potentials used in the MC based structure relaxations. (b) - (e): Relaxed structures of the periodic MC based calculations. Hydrogen bonds are marked for one molecule per structure (C: grey, N: blue, O: red, N···H bonds: orange, N-O···H bonds: green). b) α–phase (model for the structure in Figure 1a). c) Network of **2** (model for the structure in Figure 1b). d) Network of **3** (rarely observed). The inset shows an STM image of one **3** molecule (4.5 x 4.5 nm^2, 1 frame s^{-1}, I_T = 50.1 pA, U_T = –1.75 V). e) Network of **4** (not

observed).

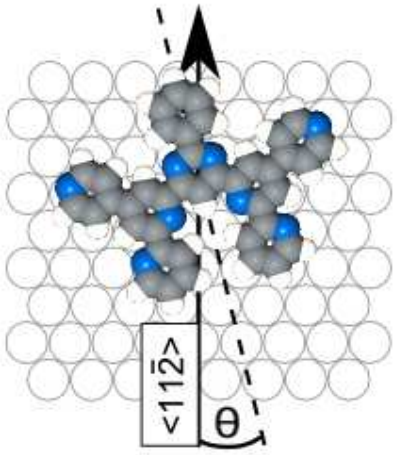

Figure S3

Definition of the azimuth angle θ of **1** with respect to the <11-2> direction of Ag(111) and Au(111).