

## Supporting Information

### CO oxidation over supported gold nanoparticles as revealed by *operando* grazing incidence X-ray scattering analysis

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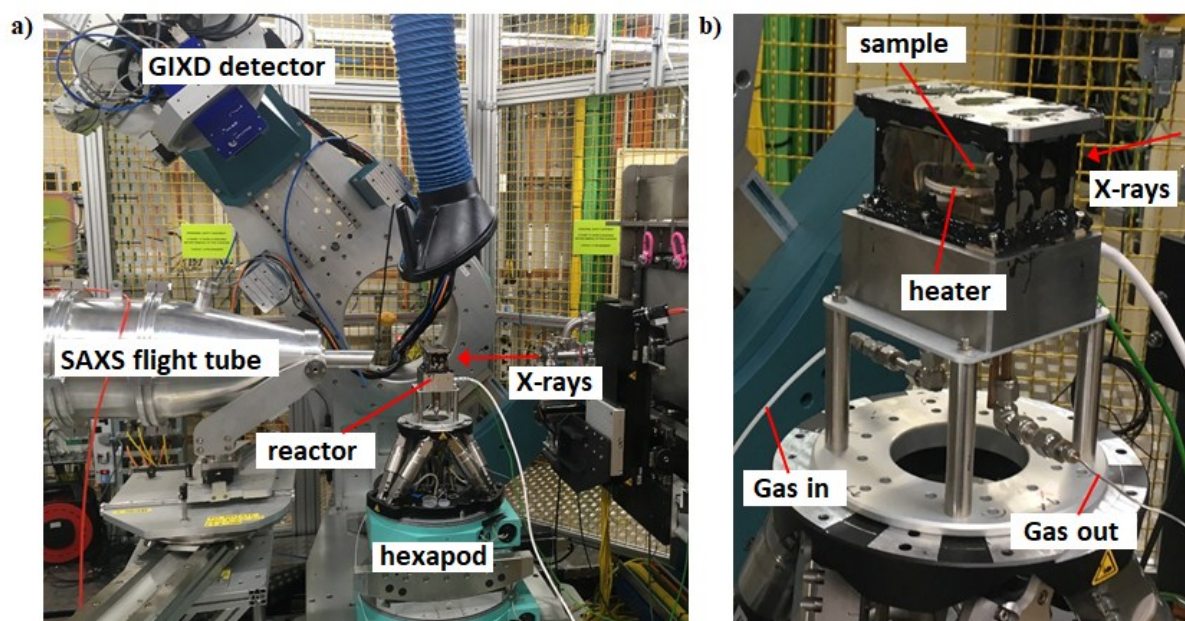
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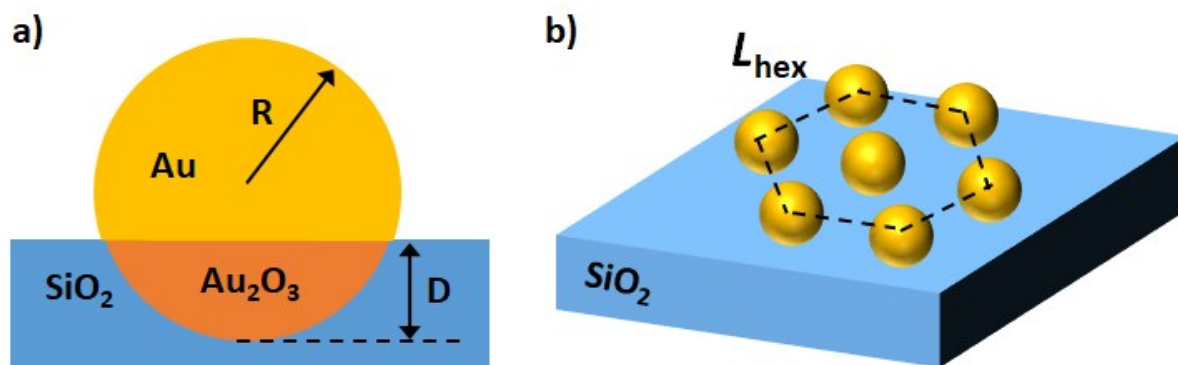
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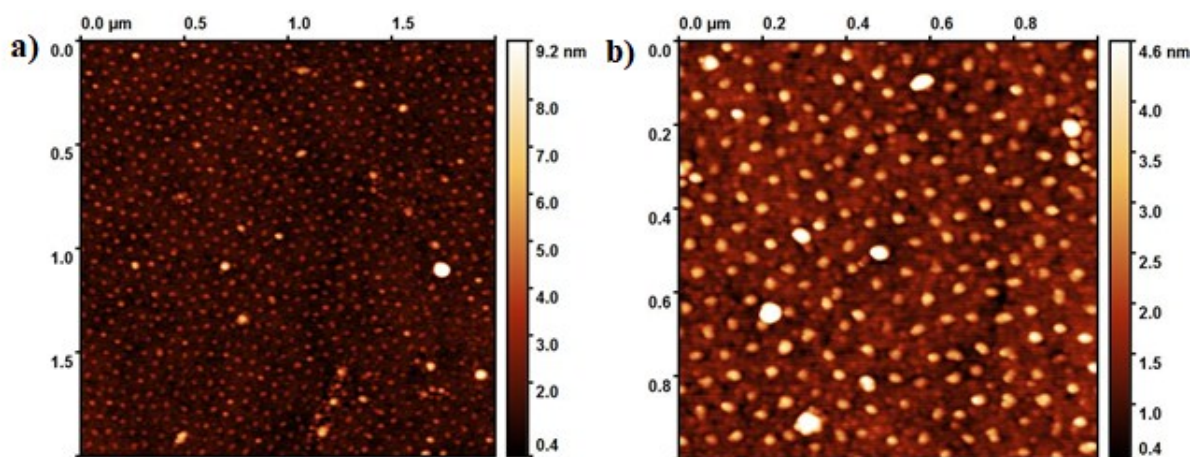
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**Figure S1.** Image of the experimental set-up at the I07 beamline, DLS, used in *operando* studies. a) Reactor cell, GIXD detector mounted on the diffractometer arm and a flight tube filled with He facing towards the GISAXS detector; b) Zoomed image of the reactor cell with the flat heating element inside fitted with the mica windows connected to the gas lines.



**Figure S2.** Schematic representation of a model for the Au/SiO<sub>2</sub>-Si catalysts used to fit the GISAXS data: (a) spheres with bimodal composition submerged into SiO<sub>2</sub> substrate and (b) forming hexagonal superlattice with the interparticle distance ( $L_{hex}$ ) of 76.2 nm.



**Figure S3.** AFM height image of the planar Au/SiO<sub>2</sub>-Si(111) catalysts after the *operando* GISAXS/GIXD studies.