

## Supplementary data

### **Stability and chemisorption properties of ultrathin TiO<sub>x</sub>/Pt(111) films and Au/TiO<sub>x</sub>/Pt(111) model catalysts in reactive atmospheres**

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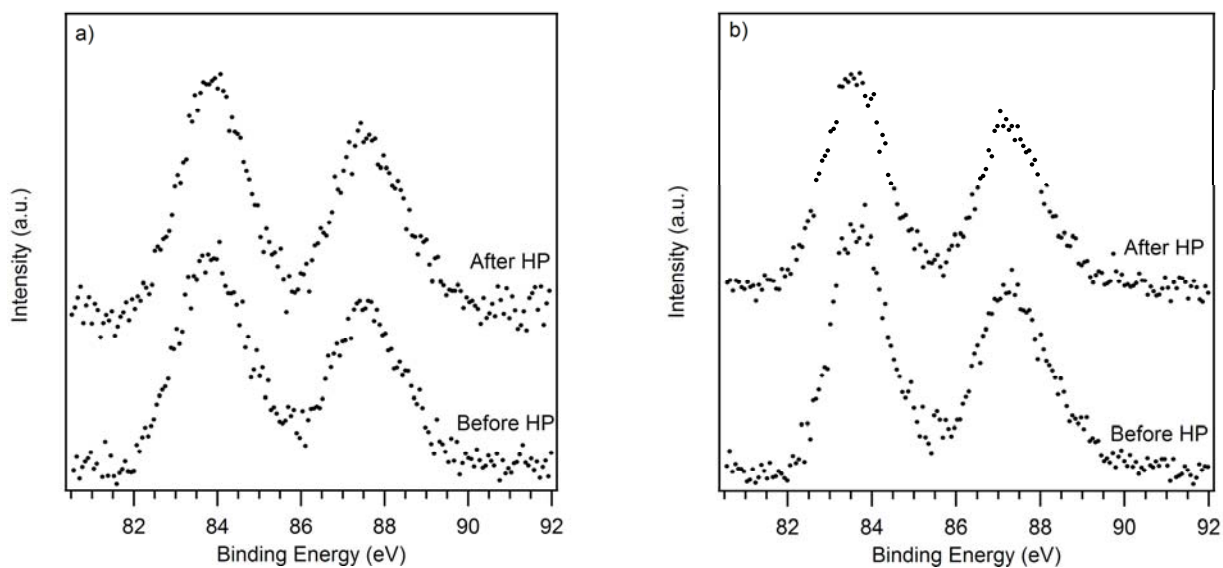
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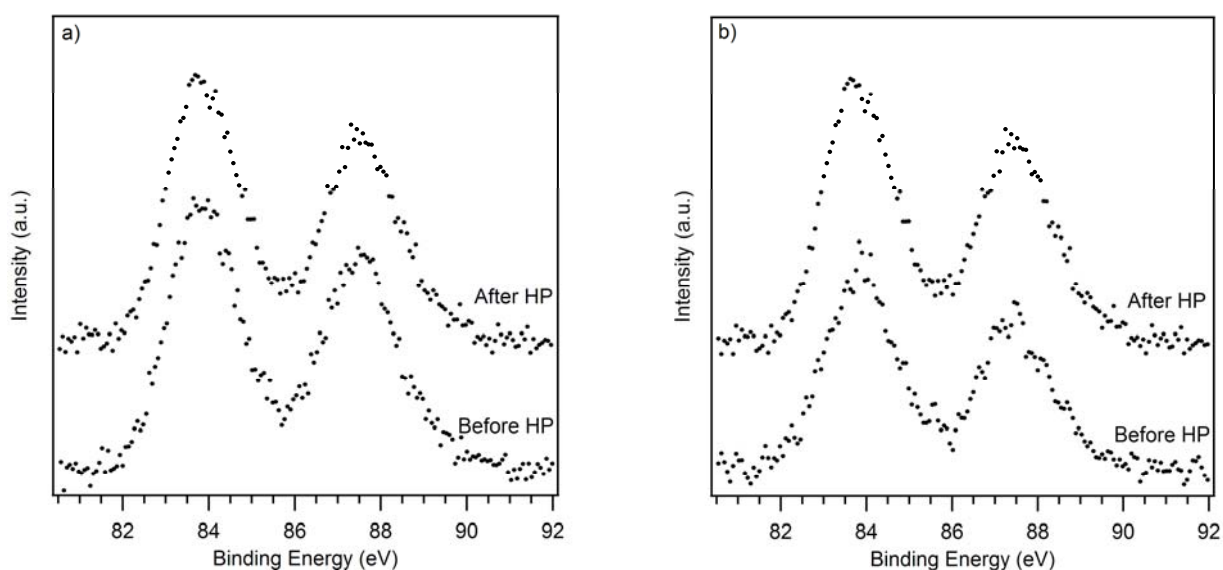
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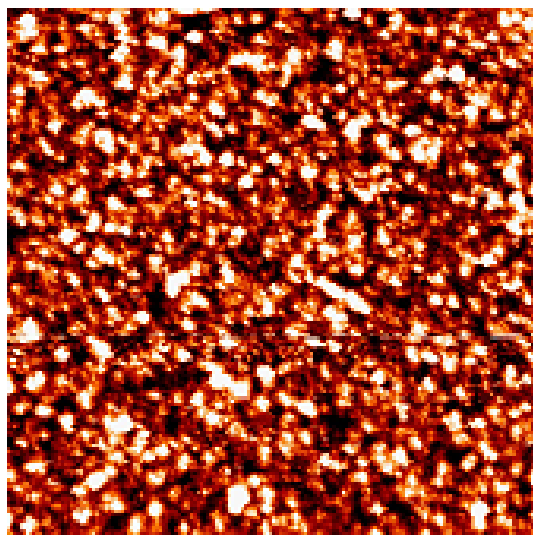


**Figure S1.** Au 4f XPS data of the system Au(0.9 ML<sub>eq</sub>)/z'-TiO<sub>x</sub>/Pt(111) (a) before and after pure CO HP exposure (b) before and after CO/O<sub>2</sub> (1:1) HP exposure (100 mbar).



**Figure S2.** Au 4f XPS data of the system Au(0.9 ML<sub>eq</sub>)/w'-TiO<sub>x</sub>/Pt(111) (a) before and after pure CO HP exposure (b) before and after CO/O<sub>2</sub> (1:1) HP exposure (100 mbar).

Figures S1 and S2 report representative Au 4f XPS data of the Au(0.9 ML<sub>eq</sub>)/TiO<sub>x</sub>/Pt(111) model catalysts before and after pure CO and CO/O<sub>2</sub> (1:1) HP exposures at 100 mbar. No evident change in the peak maxima is observed after the HP exposures.



**Figure S3.** STM image of the system  $\text{Au}(0.9 \text{ ML}_{\text{eq}})/w'\text{-TiO}_x/\text{Pt}(111)$  exposed to 100 mbar of a  $\text{CO}/\text{O}_2$  (1:1) mixture,  $100 \times 100 \text{ nm}^2$ .

Figure S3 is a representative STM image taken on  $\text{Au}(0.9 \text{ ML}_{\text{eq}})/w'\text{-TiO}_x/\text{Pt}(111)$  exposed to 100 mbar of a  $\text{CO}/\text{O}_2$  (1:1) mixture. One can observe a diffused granularity, likely due to the formation of a mixing of Au nanoparticles and  $\text{TiO}_2$  nanograins on the Pt substrate, giving rise to a RMS roughness of 0.267 nm.