

Elucidation of Active Sites for the Reaction of Ethanol on $\text{TiO}_2/\text{Au}(111)$

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Supporting Info

Ex-situ AFM images show the morphology of the clean (left panel) and roughened (right panel) Au(111) surface. The roughened AFM image shows roughly 50 kinks in the 1000 nm square image on the right. While this is not a true count of the total number of kinks in the surface, due to the limited resolution in the image, the shape of the edges allows for the rough estimation of the low end of the number of kinks per area.

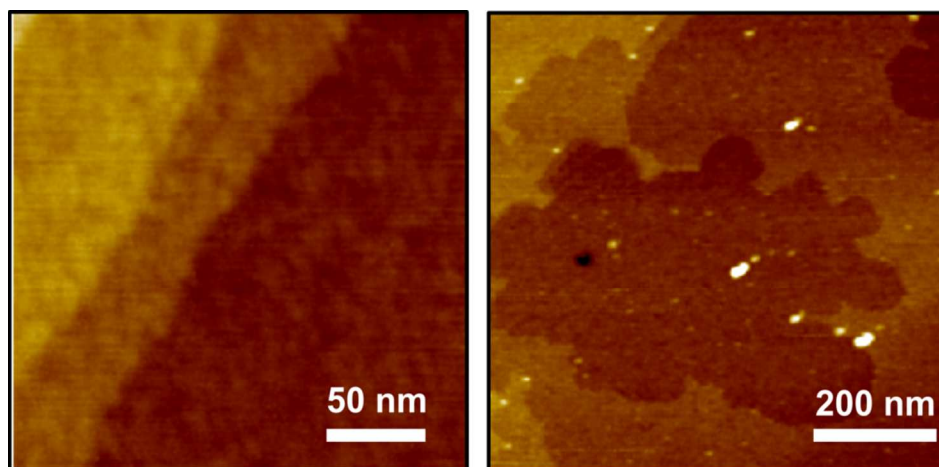


Figure S1. Ex-situ AFM images of Au(111) (left) and roughened Au(111) (right). The roughened Au(111) was sputtered and annealed to 600 K.

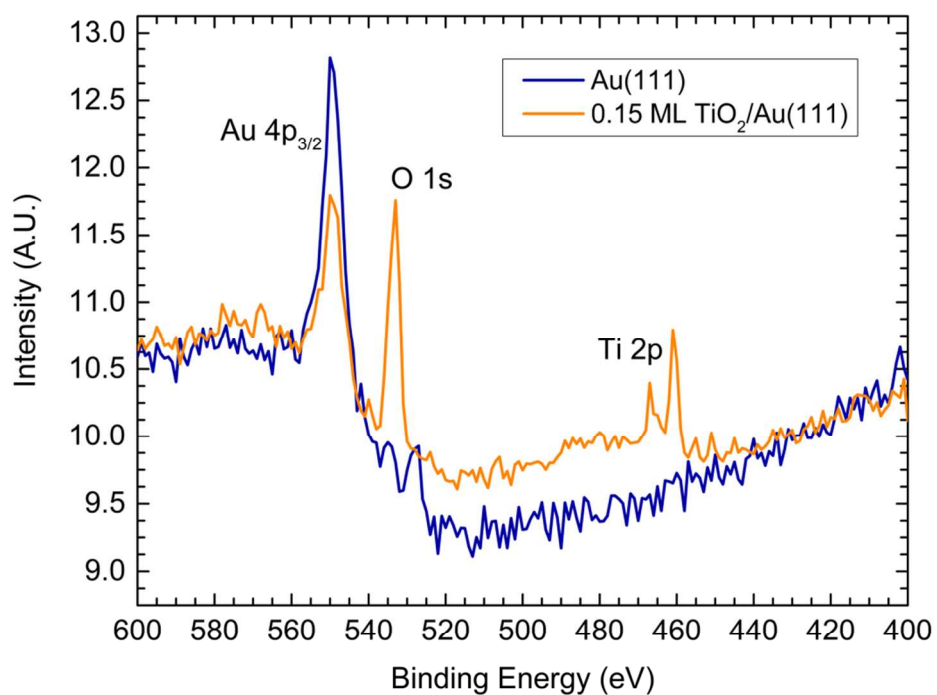


Figure S2. Ex-situ XPS: Clean Au(111) and 0.6 ML TiO₂/Au(111)

Peak analysis indicates that the broad low T_{des} is the result of several desorption peaks for ethanol, which make up the overall peak (Figure 7). The formation of several new peaks for ethanol with a higher T_{des} indicates that TiO_2 forms new adsorption sites with higher binding energies to ethanol. Analysis of the underlying peaks shows that a portions of the broad low temperature peak is made up of ethanol desorption from the Au(111) terrace (~ 172 K), Au step edges (~ 193 K), Au kink sites (~ 222 K) and TiO_2 nanoparticle sites (~ 250 K) (Figure S3).

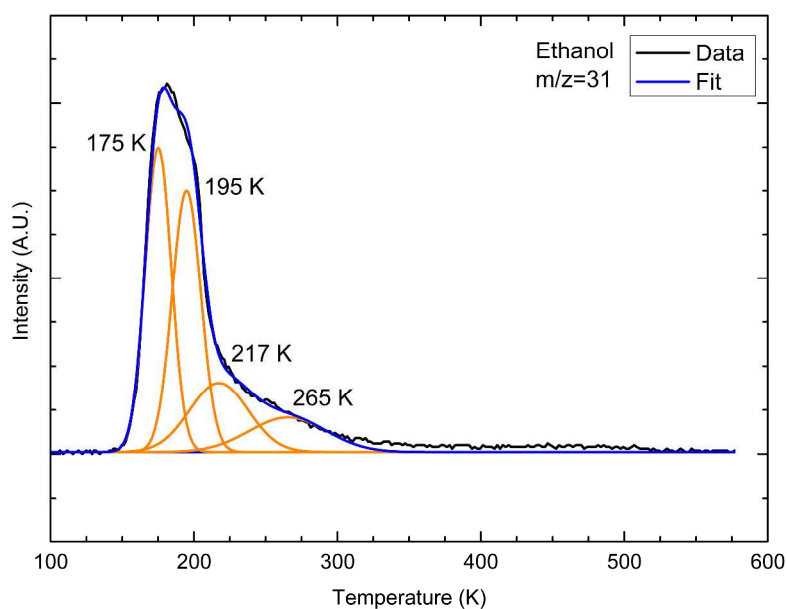


Figure S3. Peak fitting of ethanol desorption from 0.3 ML $\text{TiO}_2/\text{Au}(111)$. The peaks correspond to ethanol adsorbed to the Au(111) terrace (175 K), Au step edges (195 K), Au kink site (217 K), TiO_2 site (265 K).

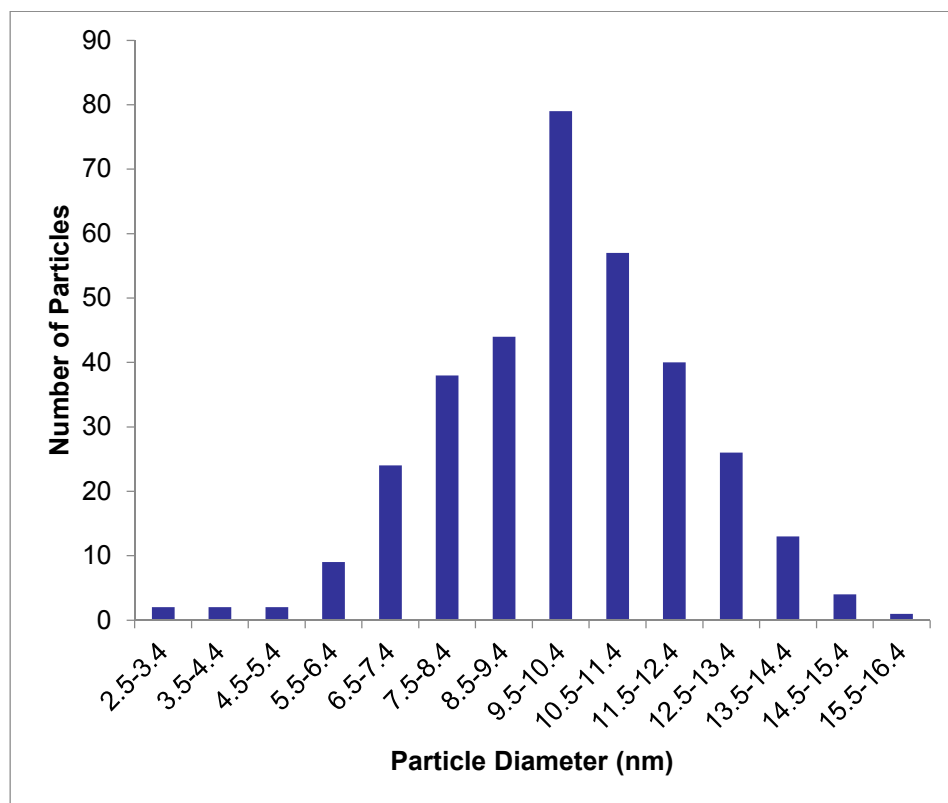


Figure S4. *Ex-situ* AFM Analysis: Histogram of particle diameters for low nanoparticle TiO₂ coverage (0.6 ML) surface.