Supporting Information:

Distinct Atomic Structure-Catalytic Activity Relationship in 3-10 nm Supported Au Particles

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Table S1. Comparison of the temperature at 50% conversion ($T_{1/2}$) for CO oxidation over silica and titania supported Au particles with sizes of 3 nm and 10 nm. The samples were "fresh" samples (O_2-H_2 treated followed by air exposure), samples after O_2-treatment only and samples after H_2-treatment only.

	$T_{1/2}$ (^oC)	
Au/Support	**Sample 3 nm**	**Sample 10 nm**
"Fresh" samples		
/SiO_2 (5% wt)	320	355
/TiO_2(5% wt)	260	265
O_2 treated samples		
/SiO_2 (5% wt)	280	310
/TiO_2(5% wt)	210	120
H_2 treated samples		
/SiO_2 (5% wt)	160	185
/TiO_2(5% wt)	80	50

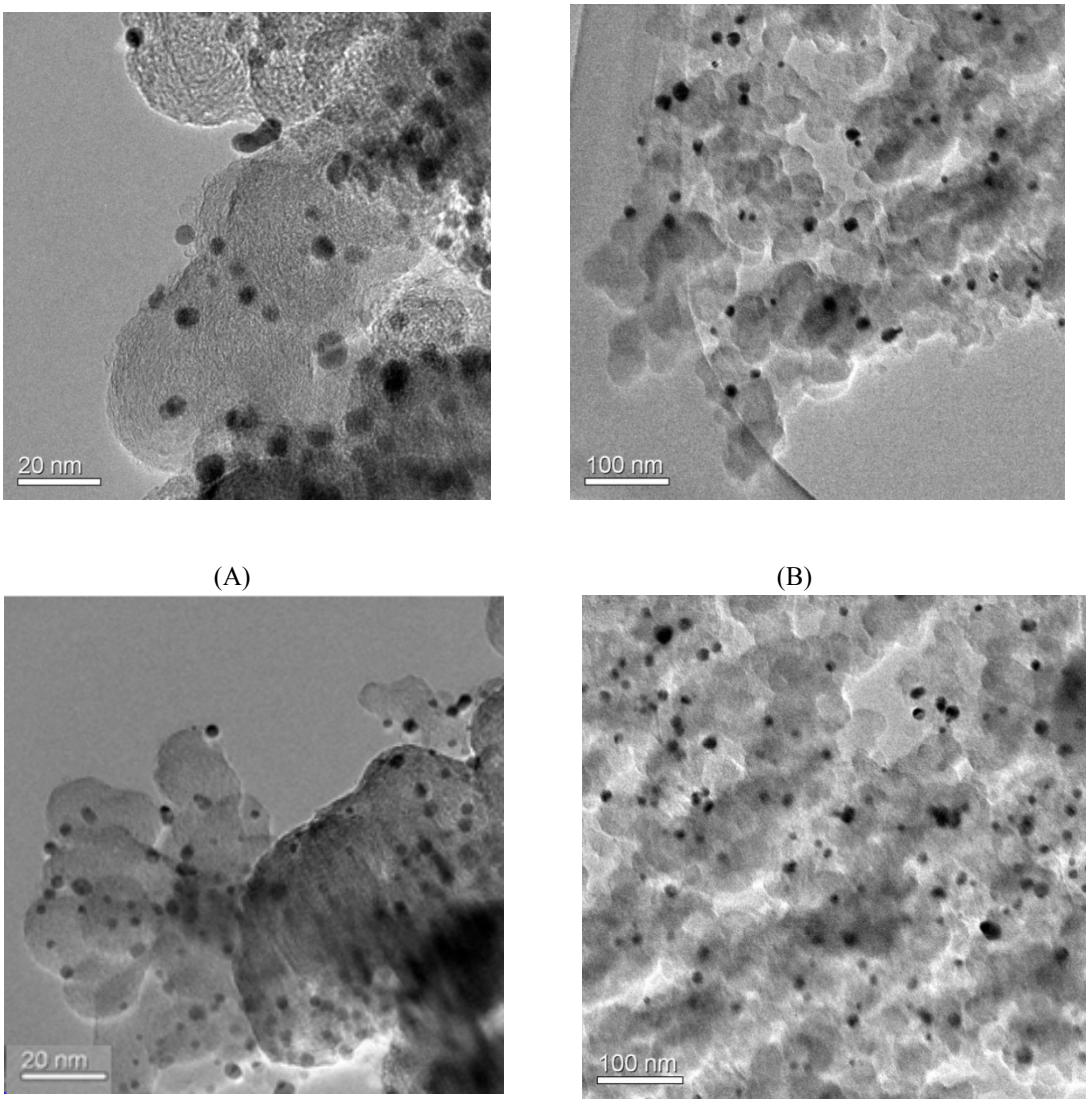
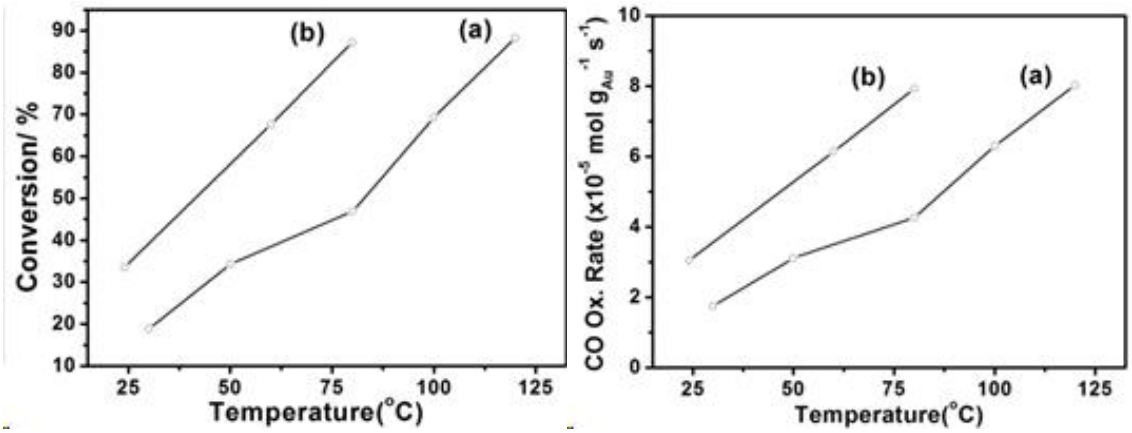


Figure S1.TEM images of 3.2 nm ±1.0 nm (A) and 10±1.7 nm (B) Au/TiO_2 as well as of 3.4±1.0 nm (C) and 10±1.9 nm (D) Au/SiO_2 particles. Note the "±" deviations from the average particles size are half widths at full maximum of the gaussian-like distribution of sizes extracted from populations of several hundreds of particles sampled by several TEM images.



(A) (B)

Figure S2. (A) CO conversion rate as a function of reaction temperature for titania supported Au particles with sizes of 3 nm (a) and 10 nm (b). The catalysts were treated under H_2 at 400 °C for 2 hrs before the measurement. (B) Au mass normalized conversion rate for the same catalysts.

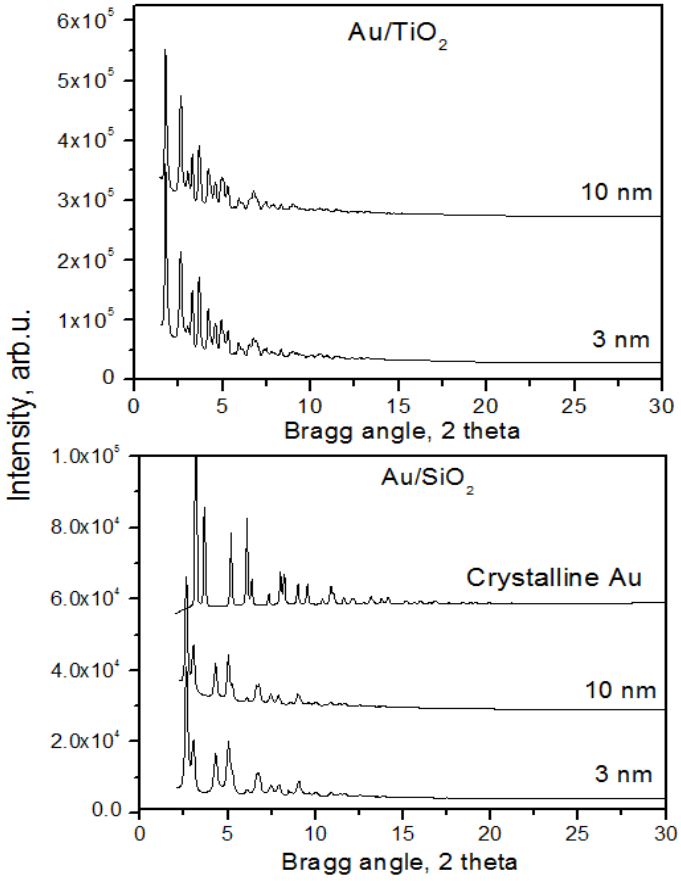


Figure S3: Experimental synchrotron x-ray diffraction patterns for Au NPs supported on silica and titania. The XRD pattern of polycrystalline Au standard is shown as well.

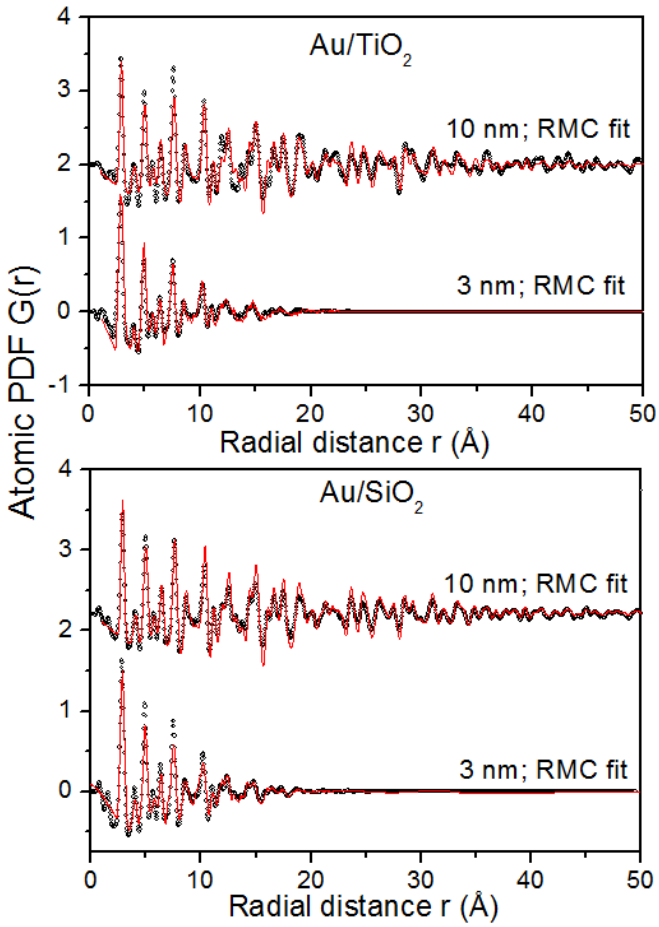


Figure S4: Experimental (symbols) and RMC model derived (line in red) atomic PDFs for Au NPs supported on titania and silica. The respective atomic configurations are shown in Fig. 5.