

## Supplementary Information

### Photocatalytic dehydrogenation of organic hydrogen carrier on Pd-TiO<sub>2</sub>(110) surfaces

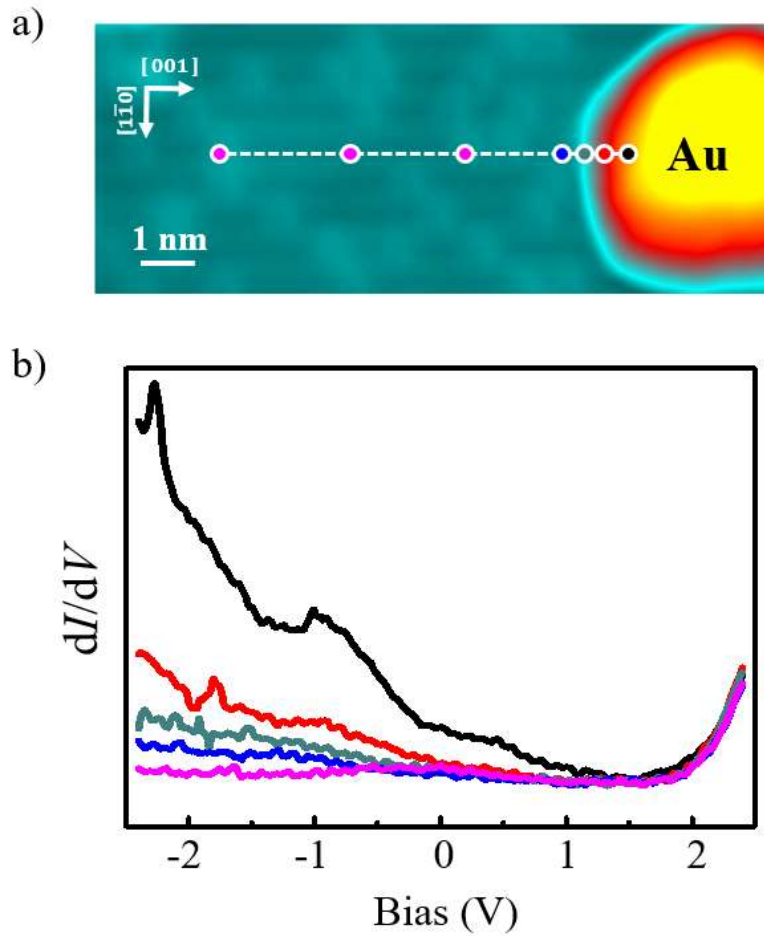
Jeong Su Kang<sup>1</sup>, Ju Yeol Baek<sup>1</sup>, Hyuntae Hwang<sup>2</sup>, Hyeon Suk Shin<sup>2,3</sup>, Chang Won Yoon<sup>4</sup>,  
Hyung-Joon Shin<sup>1\*</sup>

<sup>1</sup> Department of Materials Science and Engineering, Ulsan National Institute of Science and Technology (UNIST), Ulsan 44919, Republic of Korea.

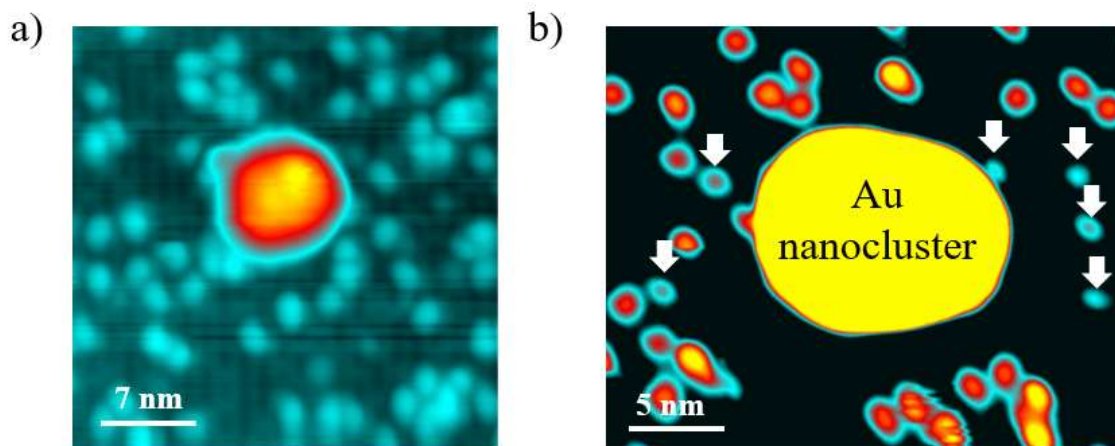
<sup>2</sup> School of Energy and Chemical Engineering, Ulsan National Institute of Science and Technology (UNIST), Ulsan 44919, Republic of Korea.

<sup>3</sup> Department of Chemistry, Ulsan National Institute of Science and Technology (UNIST), Ulsan 44919, Republic of Korea.

<sup>4</sup> Department of Chemical Engineering, Pohang University of Science and Technology (POSTECH), Pohang, Gyeongbuk 37673, Republic of Korea.



**Figure S1. STS measurements of Au nanoparticles on the  $\text{TiO}_2(110)$  surface.** (a) STM image of Au- $\text{TiO}_2(110)$  surface near the Au nanoparticles. (b)  $dI/dV$  spectra measured at (a). The colours of the  $dI/dV$  curves correspond to those applied to distinguish different measurement positions in the STS image.



**Figure S2. STM images of Au nanoparticles deposited the  $\text{TiO}_2(110)$  surface.** (a) DACH molecules adsorbed on the Au- $\text{TiO}_2(110)$  surface. (b) STM image of the  $\text{TiO}_2(110)$  surface after 15 min of 365 nm UV irradiation. Dehydrogenated adsorbates with apparent heights below 2 Å are indicated by white arrows. The contrast of the image was adjusted to distinguish the dissociated species from other species.