

Supporting Information

Highly controllable direct femtosecond laser writing of gold nanostructures on titanium dioxide surface

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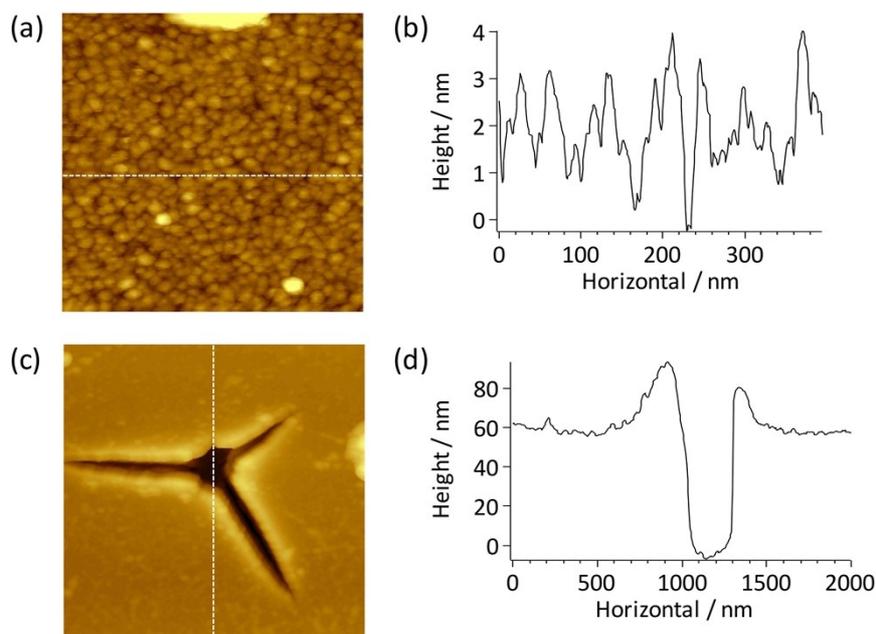


Figure S1. (a, b) AFM image of TiO₂ sol-gel film (a) and cross sectional plot (b) at a white dashed line in (a). Mean roughness (RMS) was estimated to be about 1.8 nm. (c, d) AFM image of the TiO₂ film at a crack (a) and its cross-sectional plot (d) at a white dashed line in (c). The thickness of the film was estimated to be about 70 nm.

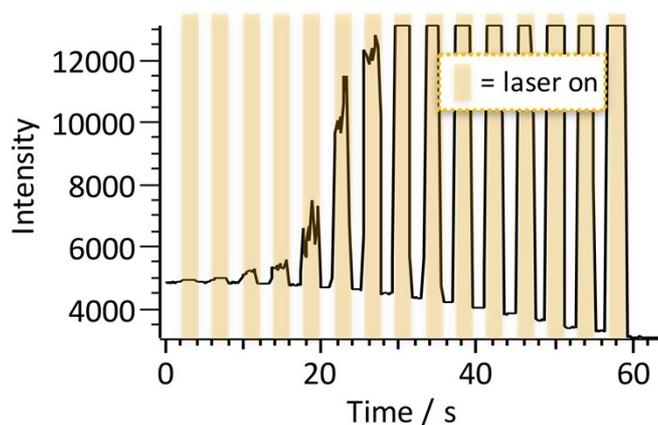


Figure S2. Intensity plot at laser focus position. While a transmission image was recorded as a movie, laser light was switched on/off every 2 s. The intensity plot shown above was extracted by calculating averaged intensity at the focus spot of about 2 x 2 μm region. The plot in figure 1e was made by estimating each averaged intensity when the laser is off (0-2 s, 2-4 s, ...).

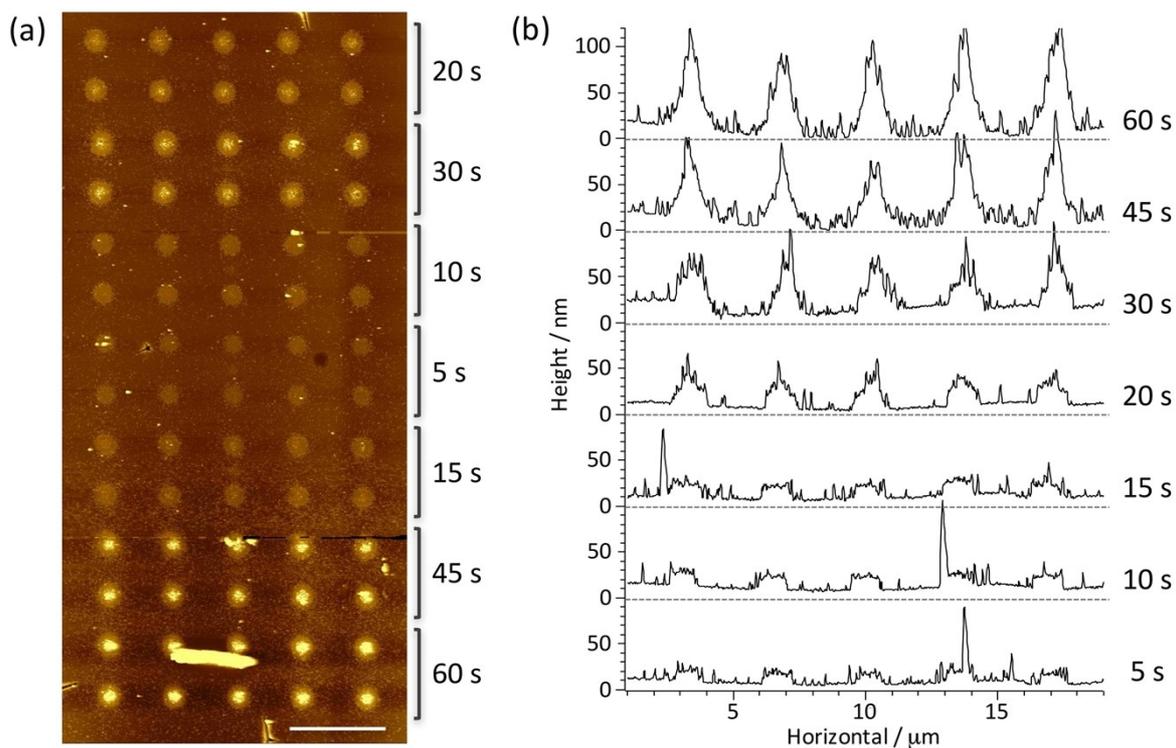


Figure S3. (a) AFM image of gold nanostructures on TiO_2 surface after laser irradiation of 5-60 s. (b) Cross sectional plot at each irradiation time. Corresponding irradiation time are indicated at right in both figures.

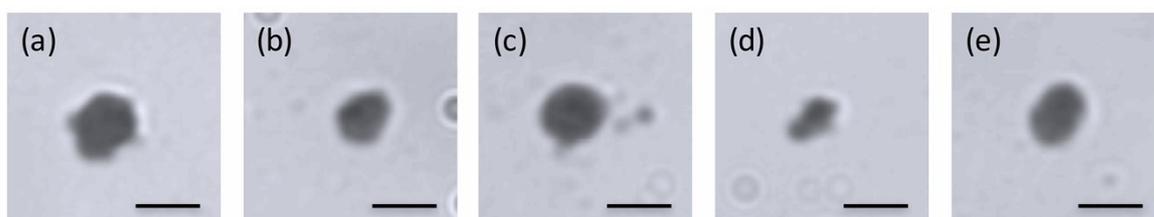


Figure S4. Transmission image of gold nanostructures deposited on glass. The gold nanostructures presented in a-e are deposited with the same condition (730 nm, 7 mW, 15 s irradiation, gold ion: 100 μM). The scale bar represents 2 μm .

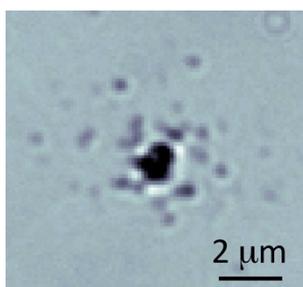


Figure S5. Transmission image of gold nanostructure deposited on “deactivated” TiO₂ surface.

A movie during the deposition can be seen in a supplement movie.

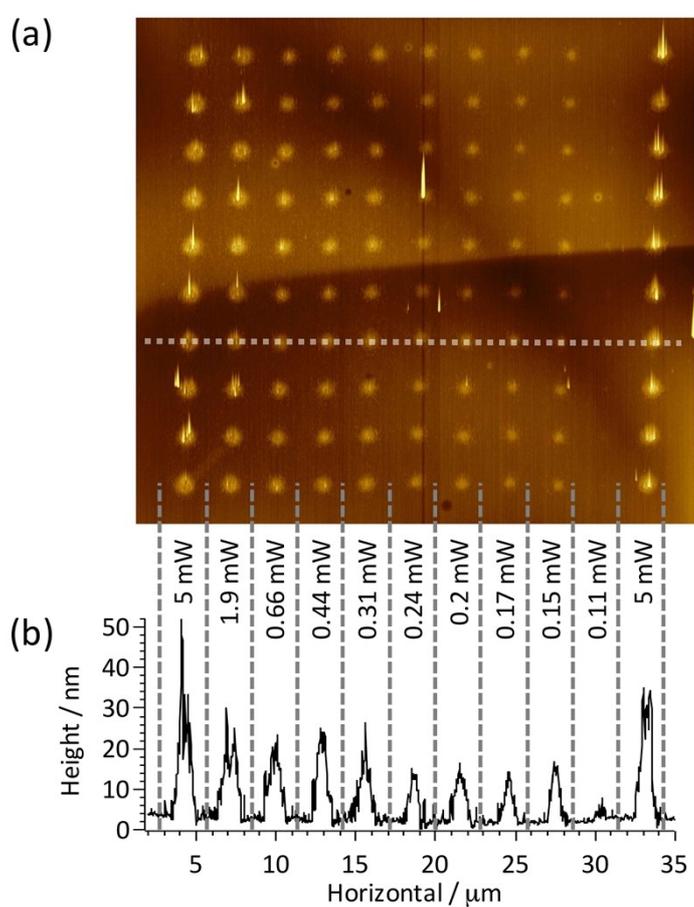


Figure S6. (a) AFM image of gold nanostructures on TiO₂ surface. (b) Cross sectional plot of a white dashed line presented in (a). The structures were deposited with different laser power, indicated above the plot in (b).

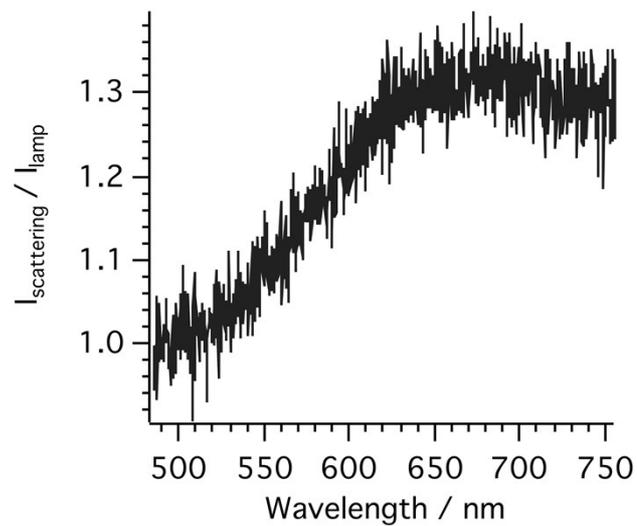


Figure S7. Dark field scattering spectrum of gold nanostructures on TiO₂ surface. The spectrum is averaged from 10 deposited spots.

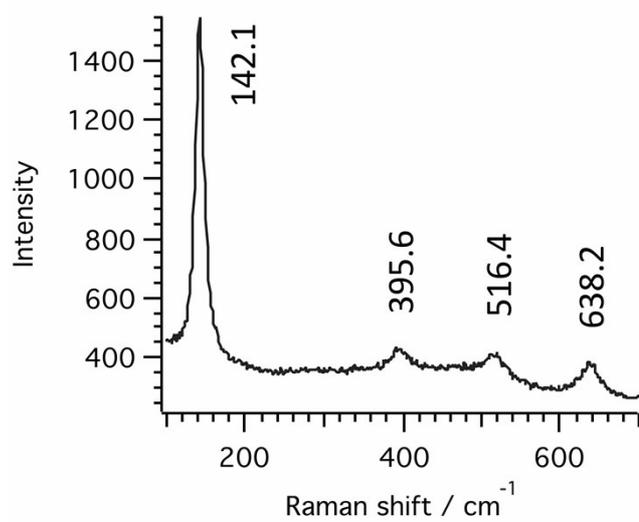


Figure S8. Raman spectrum of TiO₂ film. Specific Anatase Raman peaks were observed.