Supplementary Information

Real-time visualization of plasmonic nanoparticle growth dynamics by high-speed atomic force microscopy

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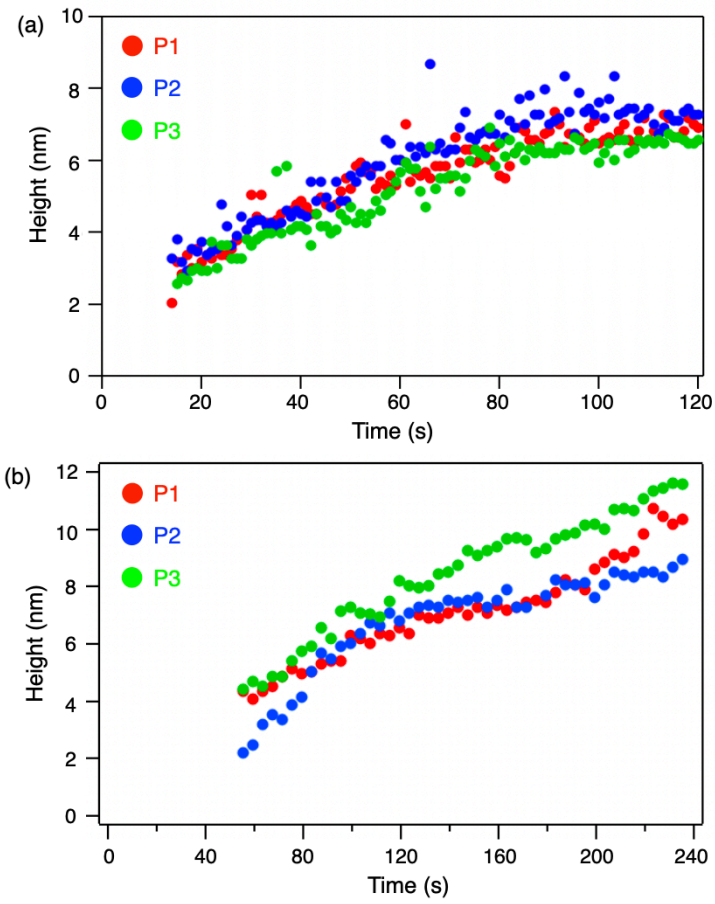
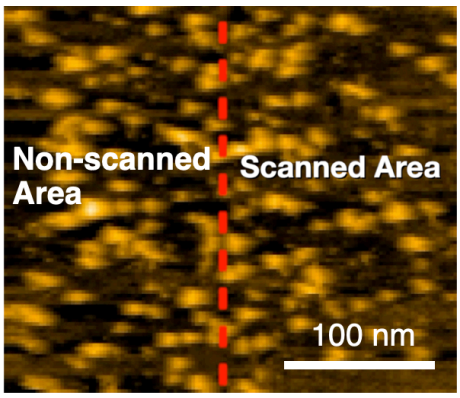


Supplementary Figure S1. (a) Temporal evolution of the heights of AgNP **P1**, **P2**, and **P3** in Fig. 2(a). (b) Temporal evolution of the heights of AgNP **P1**, **P2**, and **P3** in Fig. 3(a).



Supplementary Figure S2. HS-AFM image at the boundary between the tip-scanned and unscanned areas after AgNP formation, showing that the influence of tip scanning on AgNPs is negligible.

Supplementary Movie S1:
HS-AFM movie showing the nucleation and growth dynamics of AgNPs formed via photoreduction at a laser intensity of 10W/cm^2, captured in a 300 × 300 nm^2 range, 128 × 128 pixels, at 1 fps.

Supplementary Movie S2:
HS-AFM movie acquired in the absence of the reducing agents as a negative control. No nucleation or growth of AgNPs was observed under laser irradiation at 10 W/cm², captured in a 300 × 300 nm² range, 128 × 128 pixels, at 1 fps.

Supplementary Movie S3:
HS-AFM movie acquired outside the laser-irradiated spot as a negative control. No nucleation or growth of AgNPs was observed under laser irradiation at 10W/cm^2, captured in a 300 × 300 nm² range, 128 × 128 pixels, at 1 fps.

Supplementary Movie S4:
Magnified HS-AFM movie extracted from Supplementary Movie S1, showing AgNP **P1** indicated in Figure 2a. The movie size is 60 × 60 nm^2.

Supplementary Movie S5:
Magnified HS-AFM movie extracted from Supplementary Movie S1, showing AgNP **P2** indicated in Figure 2a. The movie size is 60 × 60 nm^2.

Supplementary Movie S6:
Magnified HS-AFM movie extracted from Supplementary Movie S1, showing AgNP **P3** indicated in Figure 2a. The movie size is 60 × 60 nm^2.

Supplementary Movie S7:
HS-AFM movie of the surrounding areas outside the original scan area, acquired after AgNPs formation by laser irradiation (after taking Supplementary Movie S1), showing that tip scanning does not noticeably affect AgNP growth. The laser intensity was 10W/cm^2. This movie was captured in a 300 × 300 nm^2 range, 128 × 128 pixels, at 1 fps.

Supplementary Movie S8:
HS-AFM movie showing the nucleation and growth dynamics of AgNPs formed via photoreduction at a laser intensity of 60W/cm^2, captured in a 300 × 300 nm^2 range, 128 × 128 pixels, at 1 fps.

Supplementary Movie S9:
Magnified HS-AFM movie extracted from Supplementary Movie S8, showing AgNP **P1** indicated in Figure 3a. The movie size is 60 × 60 nm^2.

Supplementary Movie S10:

Magnified HS-AFM movie extracted from Supplementary Movie S8, showing AgNP **P2** indicated in Figure 3a. The movie size is 60 × 60 nm^2.

Supplementary Movie S11:

Magnified HS-AFM movie extracted from Supplementary Movie S8, showing AgNP **P3** indicated in Figure 3a. The movie size is 60 × 60 nm^2.

Supplementary Movie S12:

HS-AFM movie showing the nucleation and growth dynamics of AgNPs formed via photoreduction at a laser intensity of 480W/cm^2, captured in a 300 × 300 nm^2 range, 128 × 128 pixels, at 1 fps.