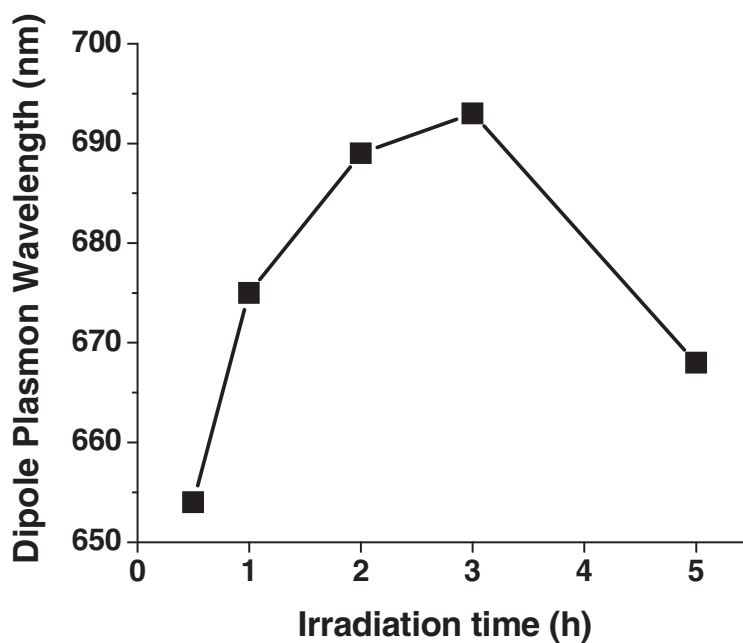


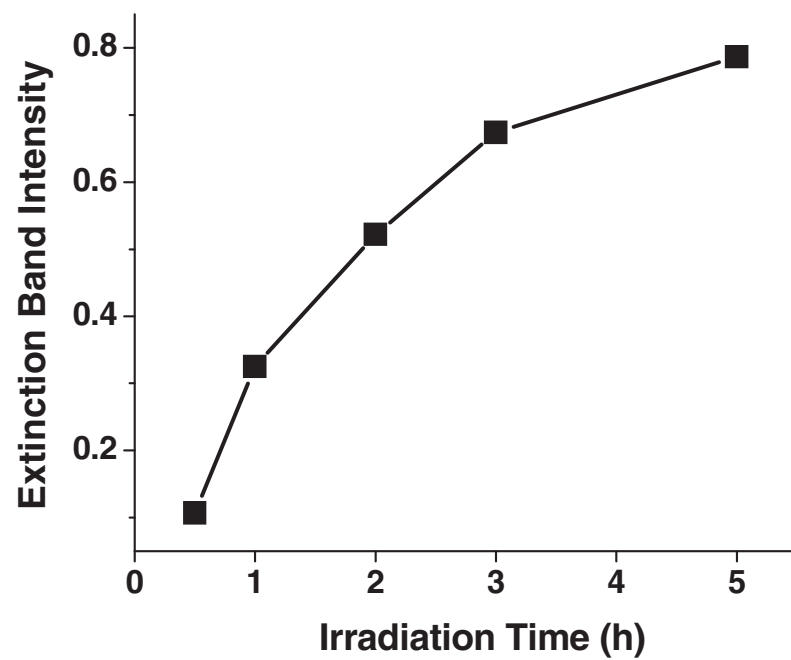
Supporting Information

## A Mechanistic Study of Photomediated Triangular Silver Nanoprism Growth

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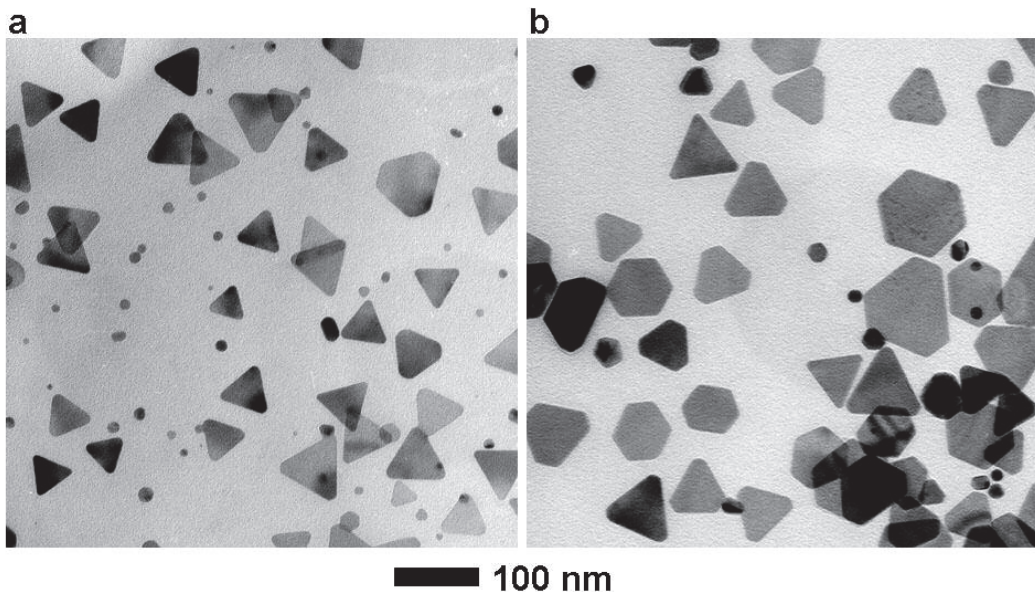


**Figure 1S.** The dipole plasmon band wavelength of silver nanoprisms as a function of irradiation time.



**Figure 2S.** The extinction band intensity of silver nanoprism colloid as a function of irradiation time.

In order to further prove that the in-plane quadrupole excitation leads to truncated nanoprism formation, we carried out the following experiment. After irradiating the silver nanoparticle solution with 550 nm light for 2 hours, we switched the excitation light wavelength to 470 nm (which coincides with the in-plane quadrupole resonance of the prisms in the solution) and continued irradiating the solution until the extinction peak at 400 disappeared. TEM images (Figure 3S) clearly indicate that the final product contains more truncated nanoprisms.



**Figure 3S.** TEM images of silver nanoprisms after 2 hours irradiation by 550 nm light (a) and then switched to 470 nm irradiation (b).

Here we describe an experiment examining the continuous growth of silver nanoprisms at different concentrations of silver ions which are added into the prepared nanoprism solution. In this experiment, silver nanoprisms was prepared by irradiating a silver nanoparticle solution with 550 nm light (adjusted pH = 11 using NaOH). After all silver nanoparticles were converted into nanoprisms, the colloid was centrifuged and resuspended in 0.3 mM sodium citrate solution and set aside.

Solutions of AgNO<sub>3</sub> were prepared at concentrations of 0.1, 0.2, 0.4, 0.6, and 0.8 mM, respectively. Sodium citrate was added into these solutions with a molar ratio of citrate: Ag<sup>+</sup> = 3:1. Subsequently, we mixed 2 mL of each solution with 2 mL of the prepared nanoprism solution and irradiated the mixture solution with 550 nm light.

Ag <sup>+</sup> Concentration (mM)	Edge Length (nm)	Thickness (nm)	Aspect Ratio (Edge length/thickness)
0	65	9.1	7.1
0.05	82	9.5	8.6
0.1	95	11.5	8.3
0.2	103	14.8	7.0
0.3	112	19.2	5.8
0.4	125	25.7	4.9

**Table 1S.** Nanoprism edge length, thickness, and aspect ratio at different Ag<sup>+</sup> concentration. For the truncated and hexagonal nanoprisms, we count their edge length as planar width.