Electronic Supplementary Information

Extended Gold Nano Morphology Diagram: Synthesis of Rhombic Dodecahedra Using CTAB and Ascorbic Acid

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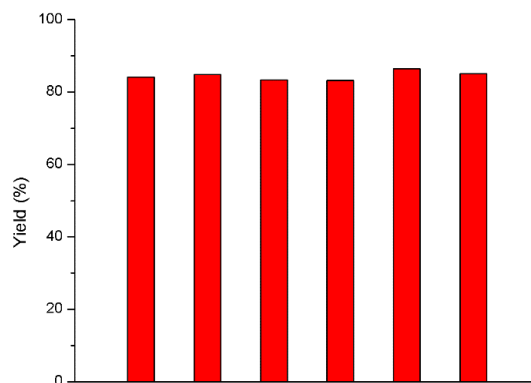
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Measuring the yield of rhombic dodecahedral nanoparticles

In order to measure the yield of the synthesized particles, SEM images of the rhombic dodecahedral particles were collected from different location in same samples. Collected SEM images were processed by an imaging software (ImageJ) in order to count the number of particles in a single images. Figure S1 represents the calculated yield of each collected image.
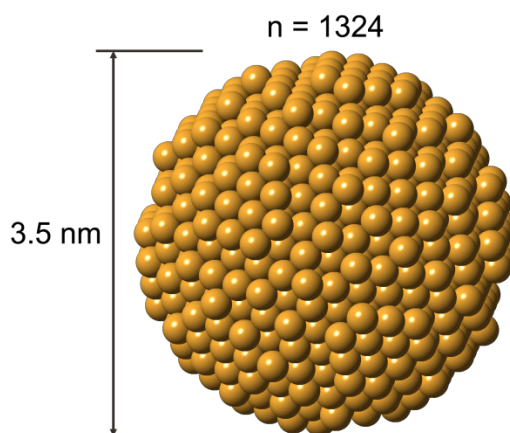
Figure S1. Calculated yield of rhombic dodecahedron.
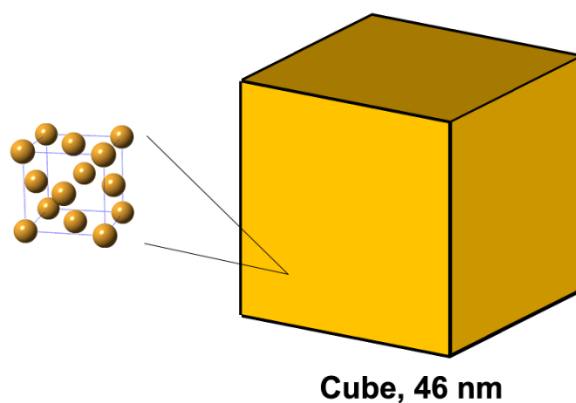
Calculation of seed concentration

[a]Method 1

We assumed that all Au ions in the seed solution were consumed during the formation of seed particles and the diameter of each particle is 3.5 nm. The crystal structure of gold is face centered cubic so each unit cell contains 4 atoms of gold. The lattice parameter of gold is 0.40786 nm and thereby the number of atoms in the unit volume and in each particle can be calculated. According to the calculated result a 3.5 nm seed particle consists of 1324 gold atoms. Finally the particle concentration of the seed solution is produced from dividing the molar concentration of Au ions by 1324, and $[Au_{seed}]$ of the growth solution is 1.03×10^{-8} mM

n = 1324

3.5 nm

[b]Method 2

Concentration of seed was obtained from calculating the number of gold atoms contained in the 46 nm cubic gold nanoparticles. We assumed that all the gold ions were consumed in the growth solution for formation of cubic nanoparticles. The crystal structure of gold is face centered cubic, and each unit cell contains 4 atoms of gold. The lattice parameter of gold is 0.40786 nm and thereby the number of atoms in the unit volume can be calculated. According to the calculated result a 46 nm cubic particle consists of 5738523 gold atoms. Finally the particle concentration of the seed solution is produced from dividing the molar concentration of Au ions by 5738523, and then $[Au_{seed}]$ of the growth solution is 3.24×10^{-8} mM.

Cube, 46 nm

SEM images in lower range of [AA]

Figure S2. SEM images of gold nanoparticles with varying AA concentration from 0.3 mM to 4.4 mM of AA and fixing CTAB concentration at 15 mM.