Supporting Information

Calculation of AgNPs concentration

The concentration of the synthesized AgNPs was calculated by the method described by Mariam et al. [7]. By assuming that AgNPs are spherical in shape, the number of silver atoms was calculated by considering that the volume ratio of silver atom to AgNPs is 74.1% in the cubic structure. The radius of silver atom is 0.144 nm, and therefore its volume is 0.0125 nm³. For AgNPs with the diameter of \( d \) nm, its volume is \( \left( \frac{\pi}{6} \right) d^3 \) nm³. Thus, the number of silver atoms (N) in each AgNPs is equal to \( \frac{74.1 \times \frac{\pi}{6} \times d^3 \times 1}{0.0125} \), which is calculated to be 31 \( d^3 \) [7]. The concentration of the AgNPs was then calculated by taking the ratio of the total number of silver atoms added to the reaction solution (\( N_{\text{Total}} \)) and the product between the number of silver atoms present in each nanoparticle (N) and the volume of the reaction solution in liters (V) and the Avogadro’s constant (\( N_A \)). In this experiment, the total number of silver atoms added to the reaction solution (\( N_{\text{Total}} \)) was \( 0.015 \times 10^{-3} \times 6.02 \times 10^{23} \) atoms. The volume of the reaction solution was 30 mL or 0.03 L.

Example 1  2.6 nm AgNPs

\[
N = 31 \times d^3 = 31 \times (2.6)^3 = 544.856
\]

\[
N_{\text{Total}} \quad \frac{0.015 \times 10^{-3} \times 6.02 \times 10^{23}}{544.856 \times 0.03 \times 6.02 \times 10^{23}} = 9.2 \times 10^{-7} \text{ M}.
\]

Example 2  10 nm AgNPs

\[
N = 31 \times d^3 = 31 \times (10)^3 = 31000
\]
The concentration of the AgNPs = \( \frac{N_{Total}}{NVN_A} \) = \( \frac{0.015 \times 10^{-3} \times 6.02 \times 10^{23}}{31000 \times 0.03 \times 6.02 \times 10^{23}} \) = 1.6 \times 10^{-8} \text{M}.

**Example 3  23 nm AgNPs**

N = 31 \( d^3 \) = 31 \( 23^3 \) = 377177

The concentration of the AgNPs = \( \frac{N_{Total}}{NVN_A} \) = \( \frac{0.015 \times 10^{-3} \times 6.02 \times 10^{23}}{377177 \times 0.03 \times 6.02 \times 10^{23}} \) = 1.3 \times 10^{-9} \text{M}.

By assuming that all silver atoms were converted to AgNPs completely, therefore, the concentrations of various AgNPs sizes of 2.6, 10, 23 nm were calculated to be 9.2 \times 10^{-7}, 1.6 \times 10^{-8}, 1.3 \times 10^{-9} \text{M}, respectively.