Supplementary Information

Synthesis of highly stable fluorescent Ag nanocluster @ polymer nanoparticles in aqueous solution

Xumei Wang, Shuping Xu, Weiqing Xu*

State Key Laboratory of Supramolecular Structure and Materials, Jilin University, Changchun 130012, P. R. China

*To whom correspondence should be addressed.

Tel: +86-431-85159383. Fax: +86-431-85193421. E-mail: xuwq@jlu.edu.cn.

1. Growth process of Ag nanoclusters monitoring by TEM.

In order to understand the growth process of Ag nanoclusters, we measured the TEM images of Ag nanoclusters at different irradiation time (Figure S1). It is found that the Ag nanoclusters grew up into the large sized Ag nanoparticles when the irradiation time was too long.

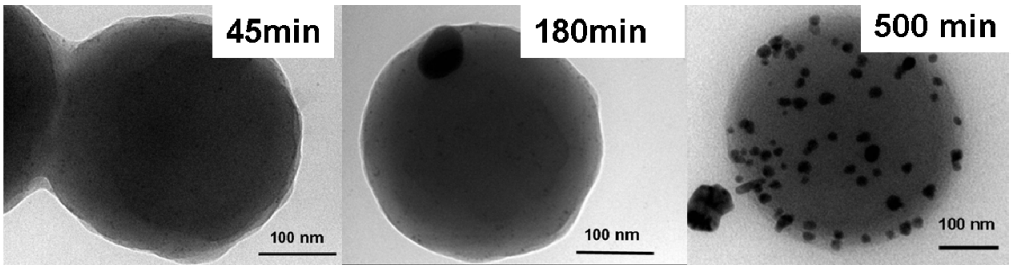

Figure S1. TEM images of Ag nanoclusters at different irradiation time.

Besides the formed Ag nanoclusters, many large Ag nanoparticles with the size of several nanometers were also observed. Figure S2 (a) and (b) show the TEM images of the resulting products when the irradiation time were 90 and 300 min, respectively. Whatever the irradiation time (<120 min) shorter or longer, we all observed the large nanoparticles in the TEM images. It should be noted that large nanoparticles became more and more with the irradiation time (see Figure S2 (b)).

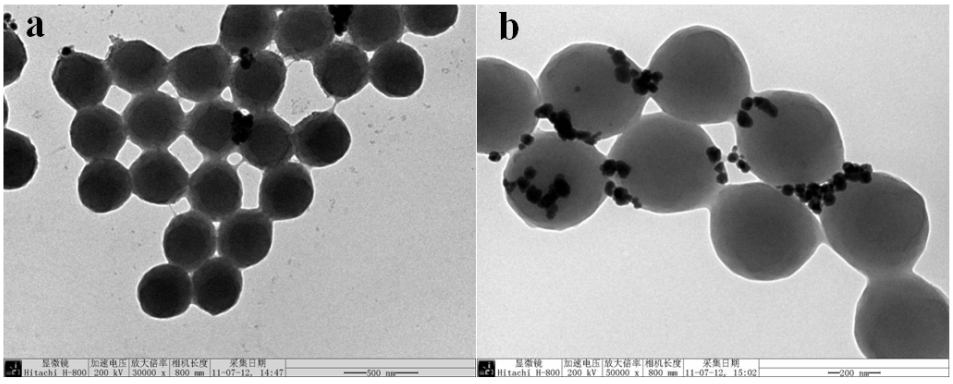

Figure S2. The TEM images of the Ag nanoclusters @ polymer nanoparticles at irradiation time 90 (a) and 300 min (b).

2. LDI measurement of Ag nanoclusters at different laser intensities.

Figure S3 A-C show the MS data of the Ag nanoclusters@ polymer nanoparticles at different laser intensities. It is found that the m/z peaks are not dependent on the laser intensity.

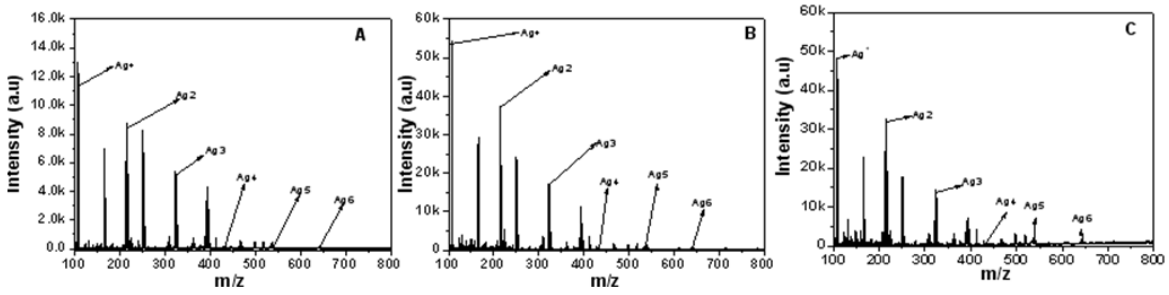

Figure S3.The LDI measurement of Ag nanoclusters at different laser intensities. A-C; the laser power was set as 145, 165 and 175 μJ.

3. Quantum yield measurement of Ag nanoclusters at different concentrations.

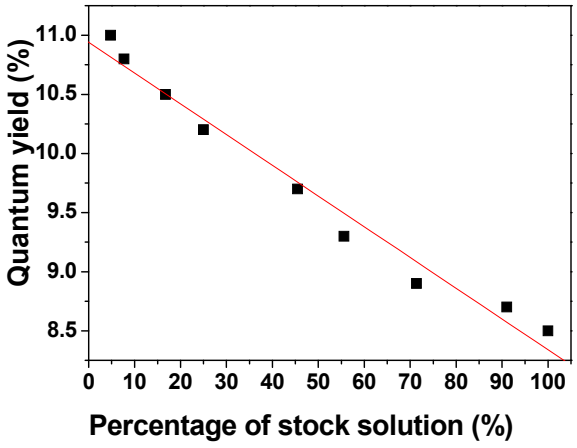

Figure S4 Concentration-dependence quantum yields of the Ag nanoclusters @ polymer nanoparticles.

The quantum yield of Ag nanoclusters under different concentrations was measured. Since the number of Ag nanoclusters on a polymer nanoparticle was fixed, the concentration of Ag nanoclusters can be expressed by the concentration of polymer nanoparticles. We diluted the samples (the mass concentration of polymer nanoparticles was 174.5 mg/mL) into 4.76%, 7.7%, 16.7%, 25%, 45.5%, 55.6%, 71.4% and 91% of the original solution. The absolute quantum yields of these diluted samples were measured by a quantum yield measurement system (C9920-02, Hamamatsu Photonics K. K., Japan). Figure S4 shows it is linear relationship between the quantum yield and the concentration of Ag nanoclusters @ polymer nanoparticles. With the polymer nanoparticles (Ag nanoclusters) concentration decreasing, the quantum yield increased.