Supplementary Information

Ultrasensitive Nucleic Acid Detection Using Confocal Laser Scanning Microscope with High Crystalline Silver Dendrites Prepared by Our New Developed Technique as a Single Particle Indicator

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Chemicals and materials

All DNA strands were synthesized by Shanghai Sangon Biotechnology Co. Ltd (Shanghai, China). Hydroxylamine (50 wt.% solution in water) was purchased from Sigma-Aldrich (St. Louis, MO, USA). All the other chemicals were of analytical reagent grade and were used as received without further purification. All the solutions were prepared with double-distilled water purified by a Milli-Q system (Millipore, Bedford, MA, USA) and stored at 4 °C. The concentration of DNA was determined using the 260 nm UV absorbance and the corresponding extinction coefficient.

Apparatus

UV-visible absorbance spectra was recorded on a Cary 500 scan UV-vis-NIR spectrophotometer (Varian, Harbor City, CA) at room temperature. Scanning electron microscopy (SEM) measurements were made on a S4800 scanning electron microscope (Hitachi, Janpan) at an accelerating voltage of 10.0 kV. Transmission electron microscopy (TEM) measurements were made on a FEI TECNAI G^2 transmission electron microscope （Netherlands）operated at an accelerating voltage of 120 kV. X-ray diffraction (XRD) measurements were made on a PW1700 X-ray diffractometer. Confocal laser scanning microscopy measurements were made on Leica DMIRE2 confocal laser scanning microscope (Germany).

Preparation: Sample 1 of silver micro-dendrites were prepared as follows: in a typical preparation, 112 μL of 1.63 M NH_2OH was diluted into 1.5 mL water, followed by adding 100μL 0.45 M $AgNO_3$ aqueous solution into above solution. Sample 2 of silver

micro-dendrties used in the separation assays were prepared as follows: in a typical preparation, 896 μL of 1.63 M NH_2OH was diluted to 652 μL water, followed by adding 800 μL of 0.45 M $AgNO_3$ aqueous solution into above solution, leading to a large amount of precipitate in several seconds.

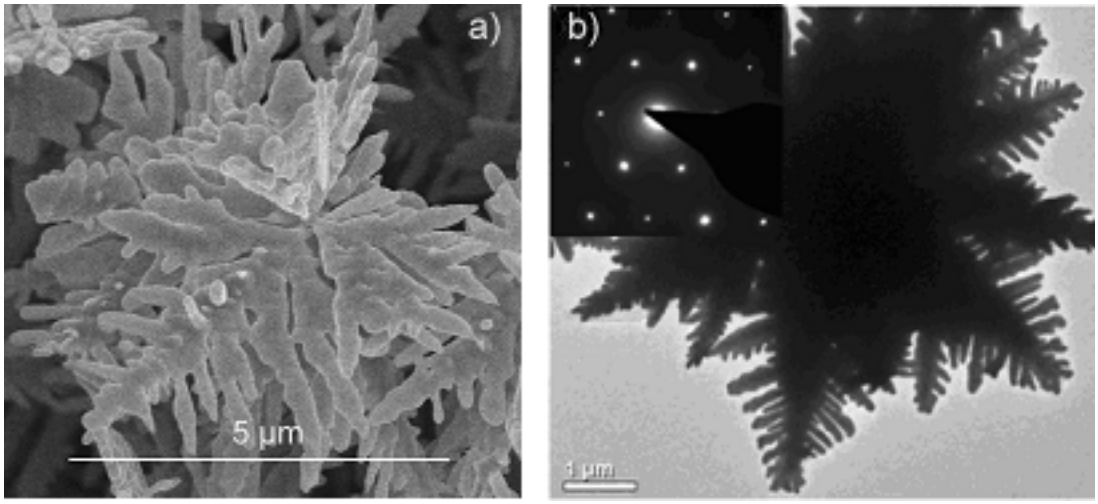


Figure S1. Typical SEM images of silver particles of sample 1 a), b) shows the TEM image of single silver dendrite and the corresponding SAED pattern (inset).

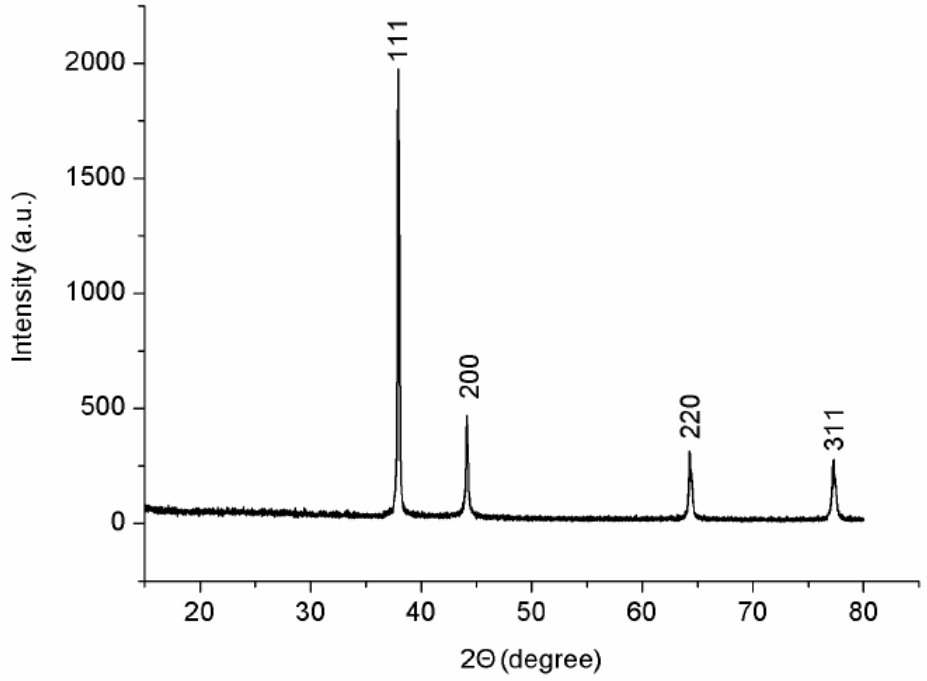


Figure S2. XRD pattern of silver micro-dendrites of sample 1.

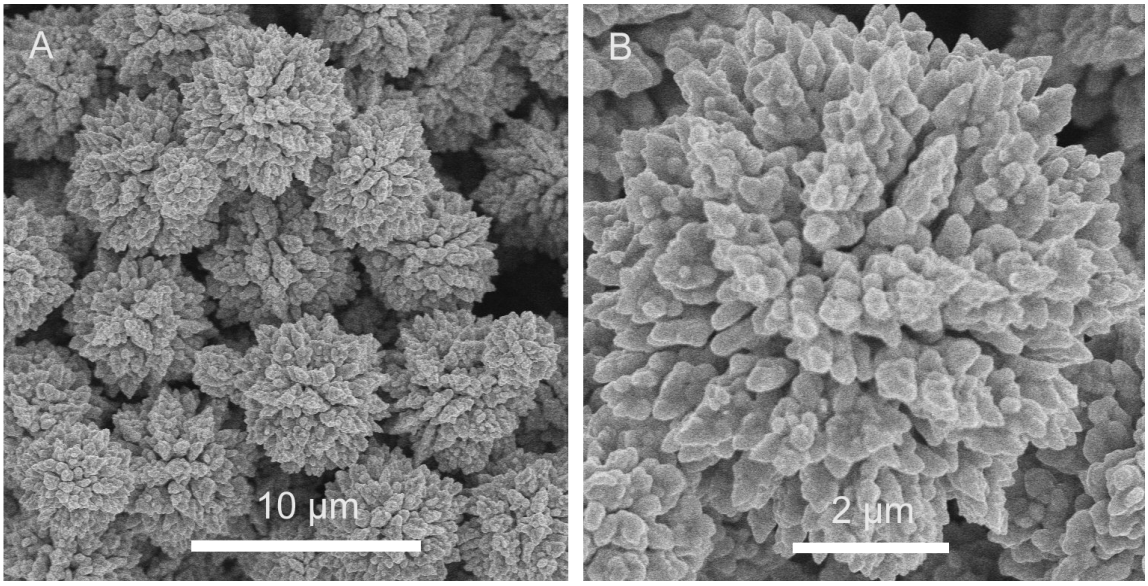


Figure S3. SEM images of silver particles obtained under otherwise identical conditions used for preparing sample 2 but with sonication involved.

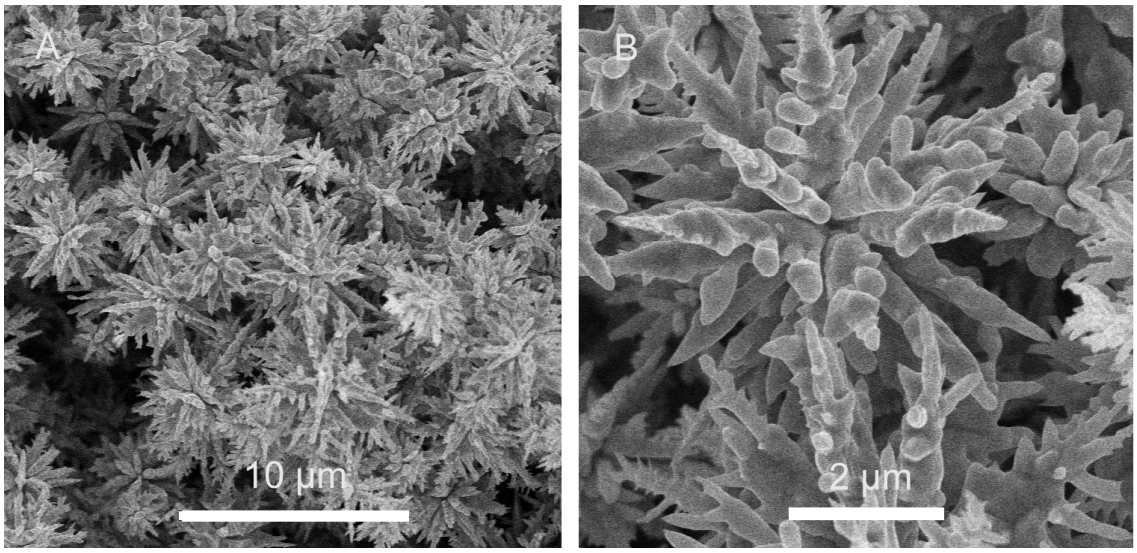


Figure S4. SEM images of the silver particles obtained at 50□, under otherwise identical conditions used for preparing sample 2.

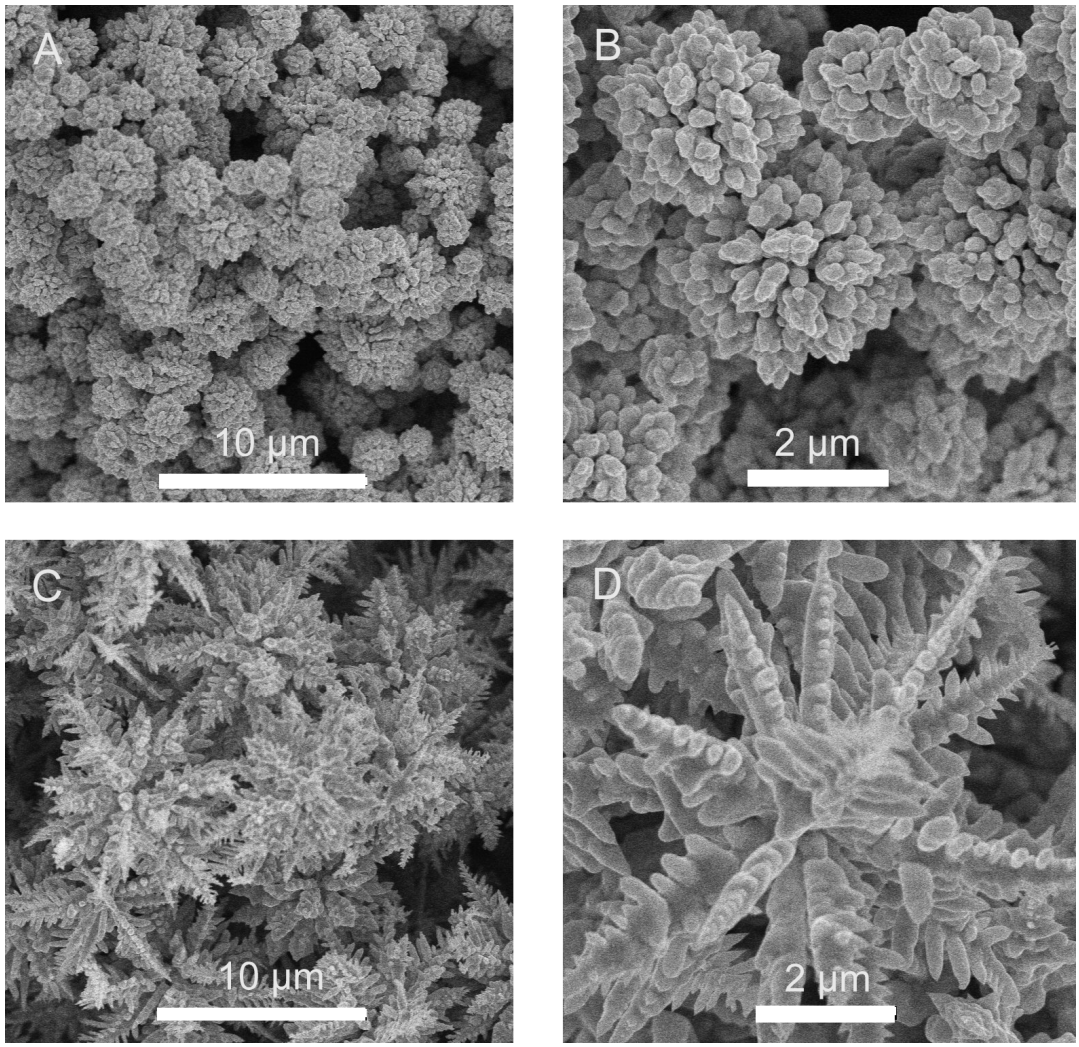
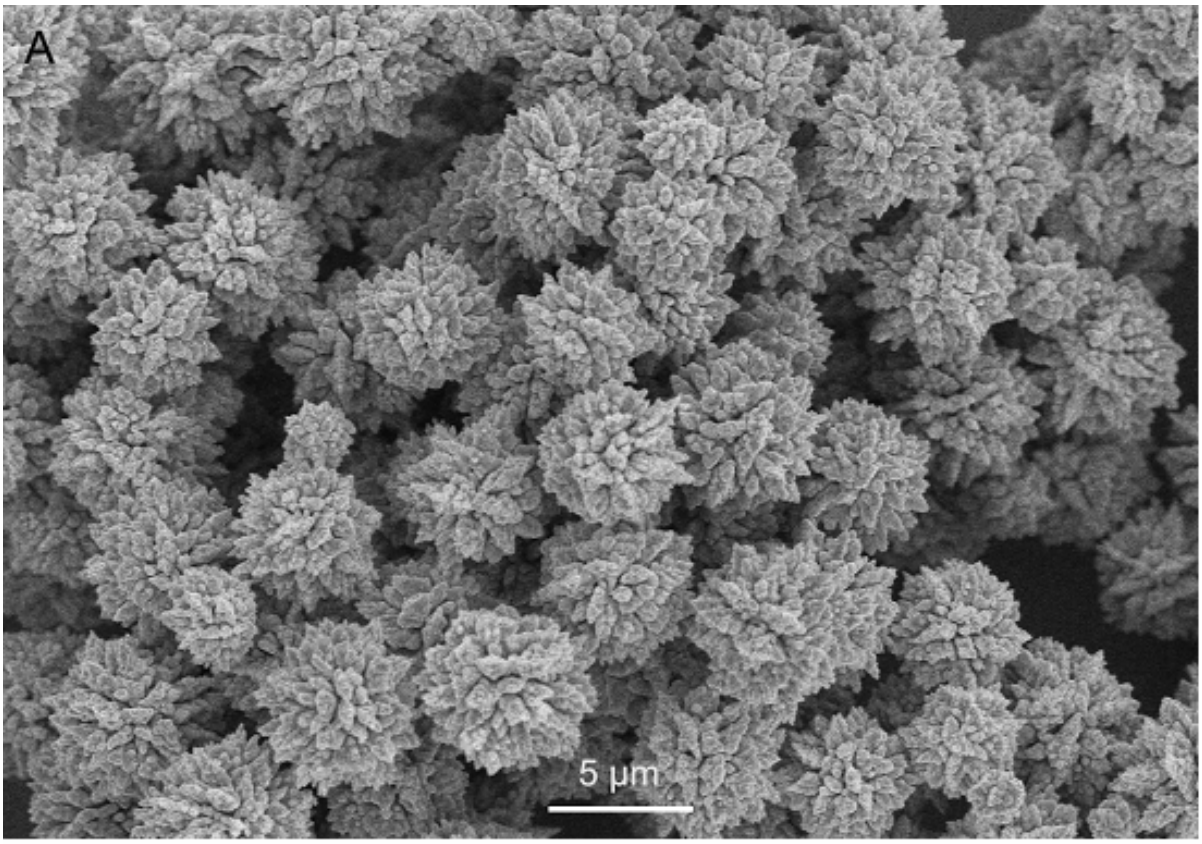


Figure S5. SEM images of silver particles obtained with molar ratio (A, B) 8:1 and (C, D) 2:1 of NH_2OH:$AgNO_3$, under otherwise identical conditions used for preparing sample 2.



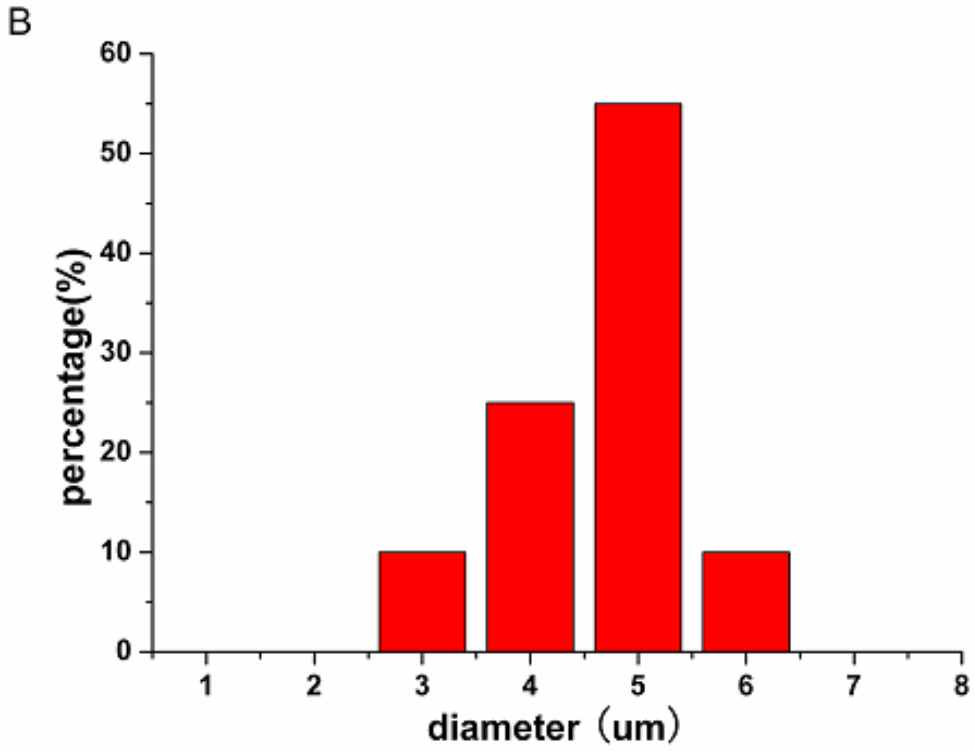


Figure S6. The SEM image of sample 2 (A) and the size distribution of sample 2 (B), 20 particles are measured to get the size distribution.

Probe 1 DNA	5’ -SH-(CH2)6TCCTCCAGG-3’
Probe 2 DNA	5’-CGCAAATACTCAAA-FAM-3’
Target DNA	5’- GAGTATTTGCGCATGGCCTGGAGGA-3’
One nucleotide mismatched DNA	5’- GAGTAGTTGCGCATGGCCTGGAGGA-3’
Two nucleotide mismatched DNA	5’- GAGTAGTTGCGCATGGCCTGAAGGA-3’
Four nucleotide mismatched DNA	5’- GAGTAGGTGCGCATGGCCTAAAGGA-3’
The absolutely mismatched DNA	5’- CTTCTTGAATTCGTATAGCGCCTCT-3’

Table 1. The sequences of the DNA used in our experiments.