

This SI replaces the previous version published on 11th March 2026, which contained an earlier, unrevised version of the SI

Supporting Information for

Seed-Mediated Tuning of Branch Size in Vertically Aligned Branched Silver Nanoplates for Large-Area and Highly Sensitive SERS Substrates

Thi Thuy Nguyen^{1,*}, Thi Bich Ngọc Nguyen¹, Duc Toan Nguyen, Trong Nghia Nguyen¹, Thi Ha Lien Nghiem¹

¹ Institute of Physics, Vietnam Academy of Science and Technology, 10 Dao Tan, Giang Vo, Hanoi 100000, Vietnam

*Corresponding author. E-mail: ntthuy@iop.vast.vn

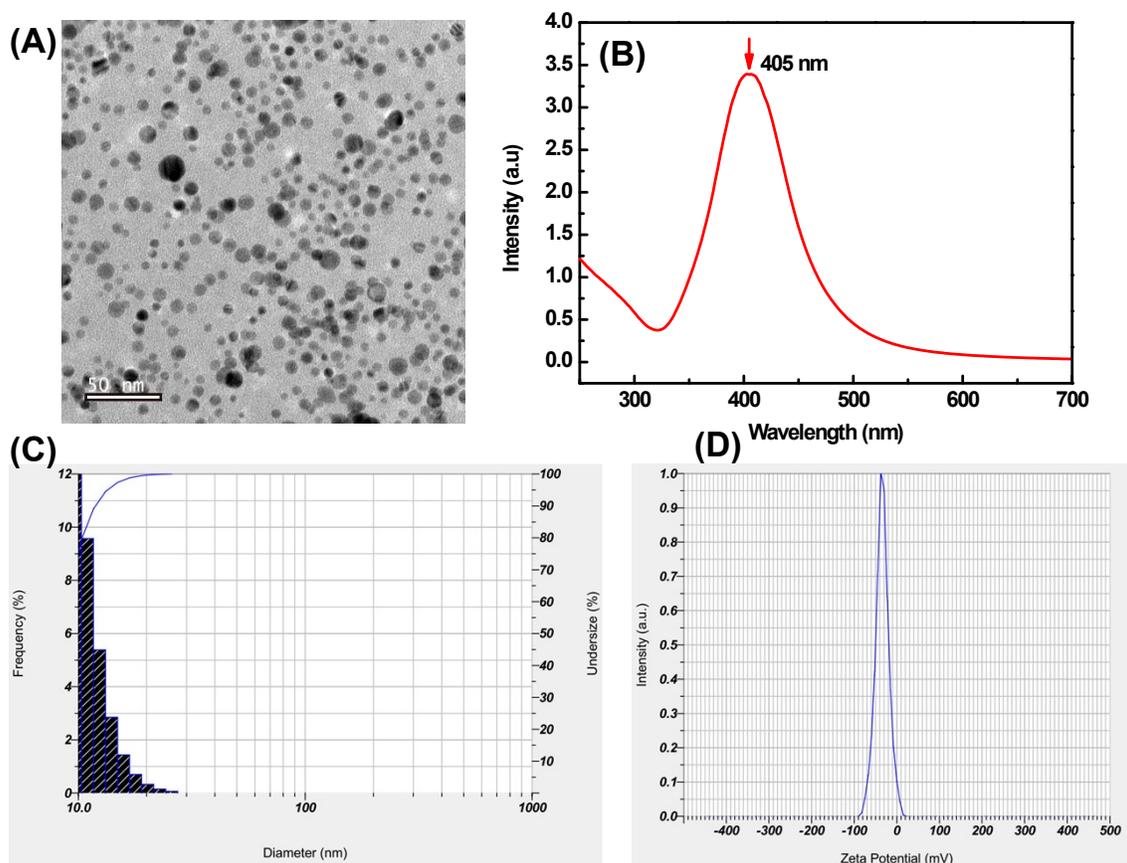


Fig. S1. (A) TEM image; (B) UV-Vis spectra; (D) Size distribution. (E) Zeta potential of the AgSs

A representative TEM image (Figure S1a) shows that the obtained AgSs have a regular and monodisperse morphology, with an average diameter of approximately 5 ± 2 nm. DLS analysis further confirmed a monomodal size distribution in aqueous dispersion, with an average hydrodynamic diameter of about 13.7 nm (Figure S1b). Zeta potential measurements indicated that the AgSs exhibited a negative surface charge in deionized water, suggesting good colloidal stability. Furthermore, the UV-Vis spectra of the AgSs suspensions revealed a distinct plasmon resonance absorption peak centered at 405 nm, which is characteristic of small spherical silver nanoparticles.

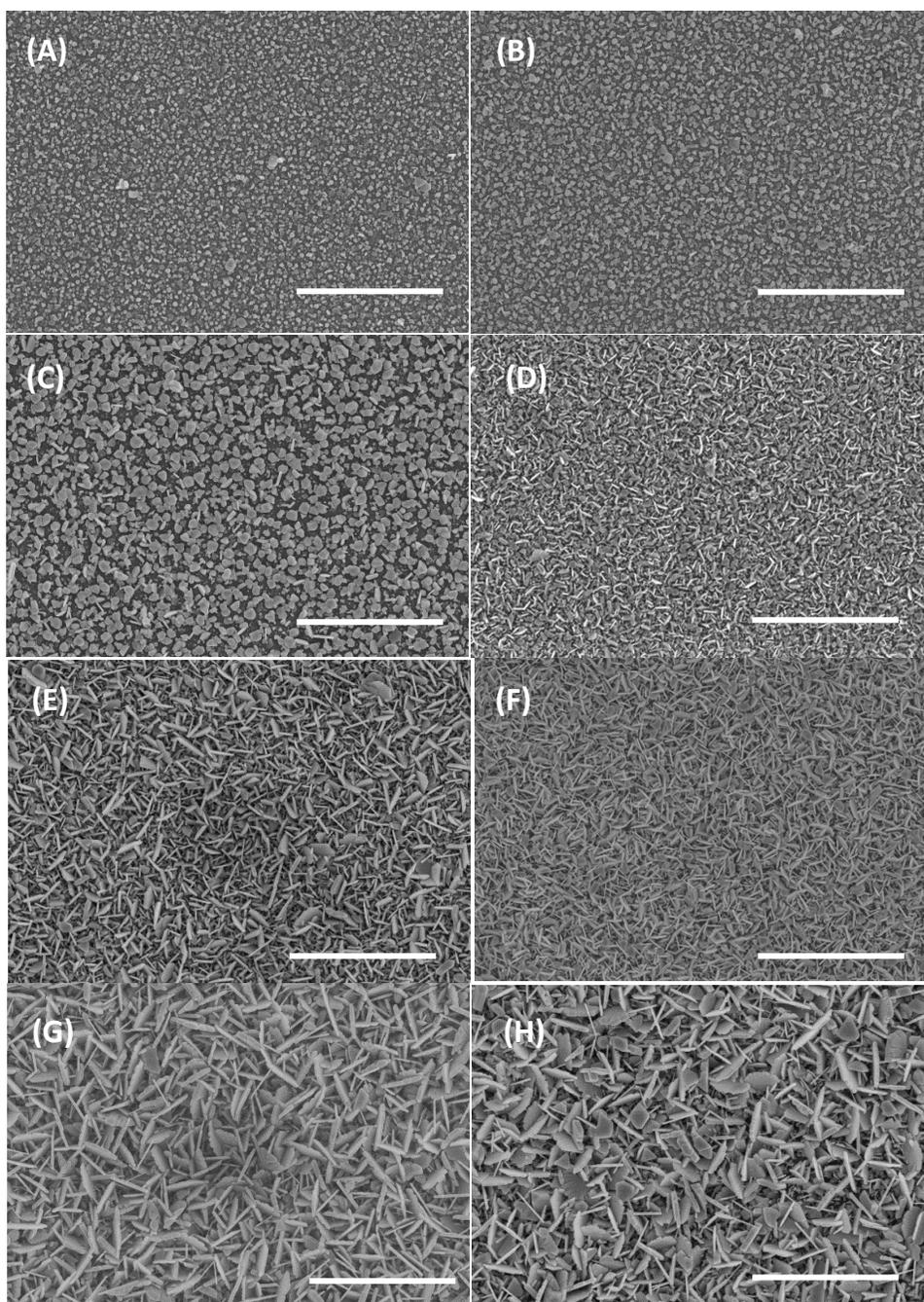


Fig. S2. SEM images of GS-BANs obtained with different concentration of AgNO_3 : (A) 0.5, (B) 1, (C) 2, (D) 5, (E) 10, (F) 15, (G) 20, (H) 30 mM. All scale bar is $2\mu\text{m}$.

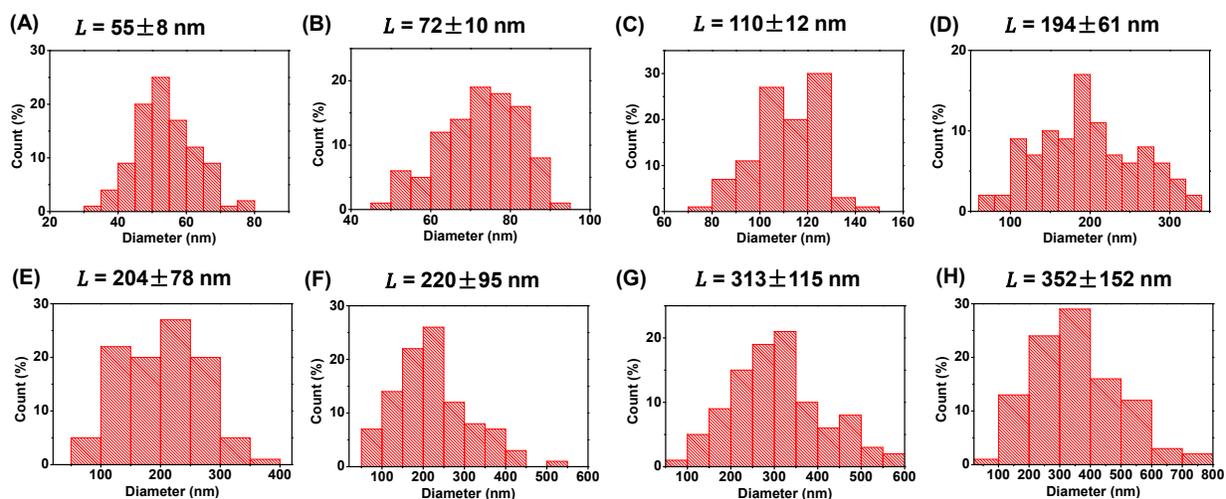


Fig. S3. Size distribution histograms ($n=100$) of GS-BANs obtained with different concentration of AgNO_3 : (A) 0.5, (B) 1, (C) 2, (D) 5, (E) 10, (F) 15, (G) 20, (H) 30 mM.

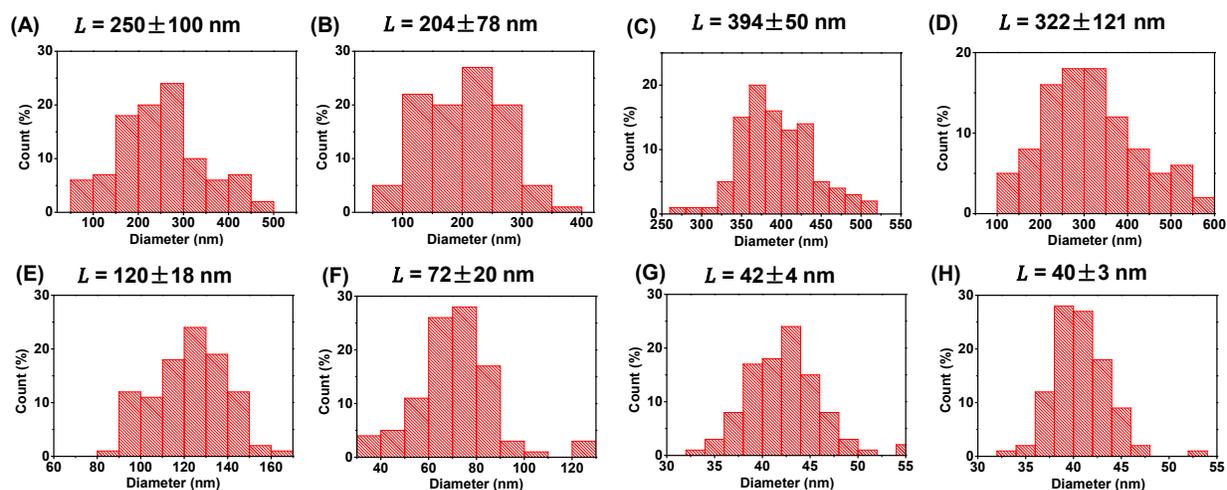


Fig. S4. Size distribution histograms ($n=100$) of GS-BANs obtained with different concentration of citric acid/citrate: (A) 7.5 mM citric acid, (B) 15 mM citric acid, (C) 30 mM citric acid, (D) 60 mM citric acid; mixed citric acid and sodium citrate in molar ratios (E) 4:1, (F) 1:1; (G) 15 mM sodium citrate; (H) 30 mM sodium citrate.

The enhancement factor (EF) is a crucial parameter for assessing the performance of a SERS substrate. To determine the EF of the fabricated GS-BANs, a reference Raman spectrum was first recorded from a 10^{-2} M R6G solution drop-cast on a glass slide. Subsequently, the SERS spectrum was acquired from a 10^{-11} M R6G solution deposited on the GS-BANs substrate. The corresponding spectra are presented in Fig. S5. At the characteristic Raman band of 610 cm^{-1} , the absolute intensity of the SERS peak was measured to be 161, compared with 207 for the standard Raman signal. The EF was calculated using the equation: $\text{EF} = (I_{\text{SERS}}/C_{\text{SERS}})/(I_{\text{RS}}/C_{\text{RS}})$ where I_{SERS} is the SERS signal at C_{SERS} concentration of R6G and I_{RS} is the Raman signal under non-SERS

conditions at C_{RS} concentration of R6G . Based on this calculation, the GS-BANs substrate exhibited an EF of approximately 7.7×10^8 .

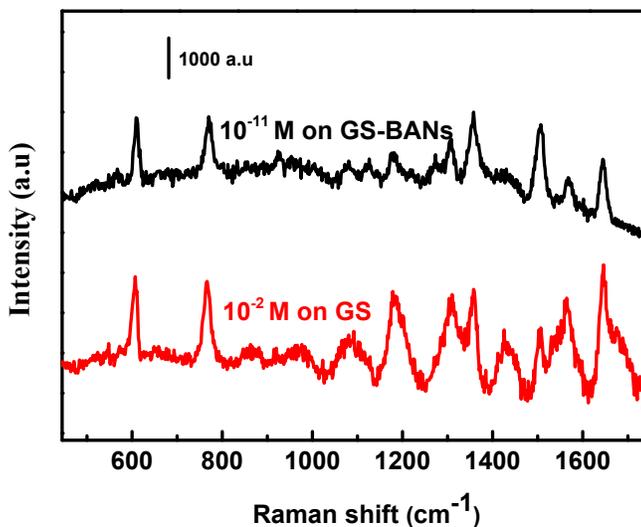


Fig. S5. (a) Normal Raman spectrum of a 10^{-2} M R6G solution drop-cast on a bare glass slide; (b) SERS spectrum of a 10^{-11} M R6G solution obtained from deposition on GS-BAN substrates.

Similarly, the enhancement factor for CV was evaluated at the characteristic Raman band located at 910 cm^{-1} . The SERS spectrum obtained from a 10^{-10} M CV solution on the GS-BANs substrate exhibited an absolute peak intensity of 632, compared to 611 for the normal Raman spectrum of a 10^{-2} M CV solution on bare glass (Fig. S6). Applying the same formula, the calculated EF value was on the order of 9.5×10^7 . In addition, the enhancement factor for MG was calculated at its characteristic Raman band at 1610 cm^{-1} . The SERS spectrum of a 10^{-9} M MG solution deposited on the GS-BANs substrate showed a peak intensity of 631 whereas the corresponding normal Raman spectrum of a 10^{-1} M MG solution on the glass exhibited a peak intensity of 1107 cm^{-1} (Fig. S7). Using the EF expression, the resulting EF was determined to be on the order of 5.7×10^7 .

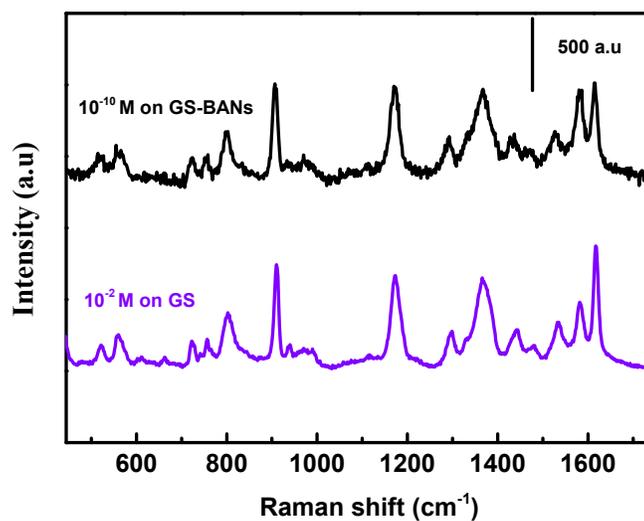


Fig. S6. (a) Normal Raman spectrum of a 10⁻² M CV solution drop-cast on a bare glass slide; (b) SERS spectrum of a 10⁻¹⁰ M CV solution obtained from deposition on GS-BAN substrates.

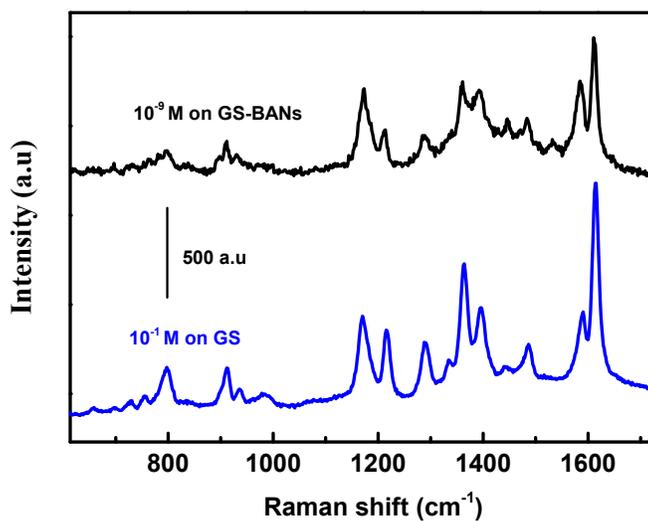


Fig. S7. (a) Normal Raman spectrum of a 10⁻¹ M MG solution drop-cast on a bare glass slide; (b) SERS spectrum of a 10⁻⁹ M MG solution obtained from deposition on GS-BAN substrates.