Supporting information

Silver decahedral nanoparticles with uniform and adjustable sizes for surface-enhanced Raman scattering-based thiram residue detection

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Fig. S1. The TEM images of the AgDeNPs obtained by increasing the molar ratio of Ag ions to decahedral seeds. (Scale bar: 200 nm)
The size distributions of the AgDeNPs with different sizes: 47±4, 85±3, 96±4, 112±5, 124±3, 135±5 and 161±4 nm.
Fig. S3 Extinction spectra of nanoparticle solutions of different sizes being diluted, and the extinction value for each sample is 0.23±0.01.

Fig. S4 Comparison of SERS spectra of (a) 4-MBA solution at concentration 1.0×10^{-10} M with Raman spectra of 4-MBA solid powder, (b) thiram solution at concentration 1.0×10^{-7} M with Raman spectra of thiram solid powder.
Fig. S5 The SERS spectra of (a) 4-MBA with concentration of $1.0 \times 10^{-8}$ M and (b) thiram with concentration of $1.0 \times 10^{-7}$ M were detected by SERS substrates prepared with freshly synthesized AgDeNPs-1st and that placed for half a year, respectively.

Since we ensure the same detection conditions for the two tests, we use formula $EF = \frac{I_{\text{SERS}}}{I_{\text{Raman}}} \times \frac{C_{\text{Raman}}}{C_{\text{SERS}}}$ to calculate the enhancement factor, which has been deduced by previous work.\(^1,\ 2\) Where $I_{\text{SERS}}$ and $I_{\text{Raman}}$ represent the SERS intensity of 4-MBA molecules adsorbed on AgDeNPs-1st substrate at 1585 cm\(^{-1}\) and the normal Raman intensity of 4-MBA molecules at 1593 cm\(^{-1}\) respectively, $C_{\text{SERS}}$ and $C_{\text{Raman}}$ represent the concentration of 4-MBA molecules in SERS and Raman spectra respectively, the $C_{\text{Raman}}$ is 0.1 M and the $C_{\text{SERS}}$ is $1.0 \times 10^{-10}$ M. The calculated enhancement factor is $8.7 \times 10^{10}$.

Fig. S6 SERS spectra for 4-MBA at concentration $1.0 \times 10^{-10}$ M and Raman spectra for 4-MBA at concentration 0.1 M.
References
