

Supporting Information

Electrodeposition of Ag nanosheet-assembled microsphere @ Ag dendrites core-shell hierarchical architectures and their application in SERS

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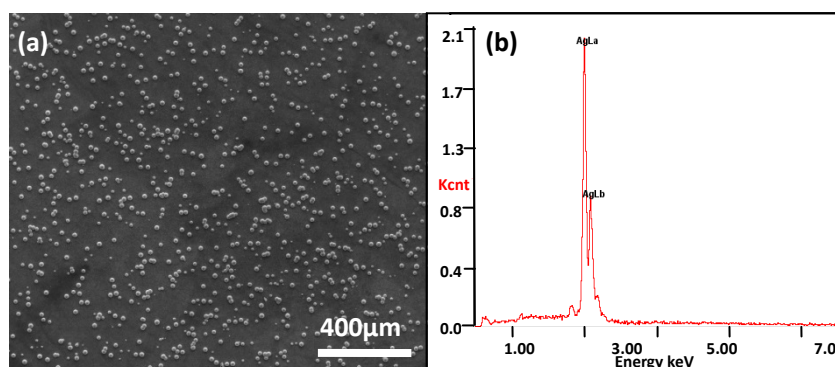


Fig. S1. (a) and (b) SEM image and EDX energy spectrum of the Ag core-shell hierarchical microstructures.

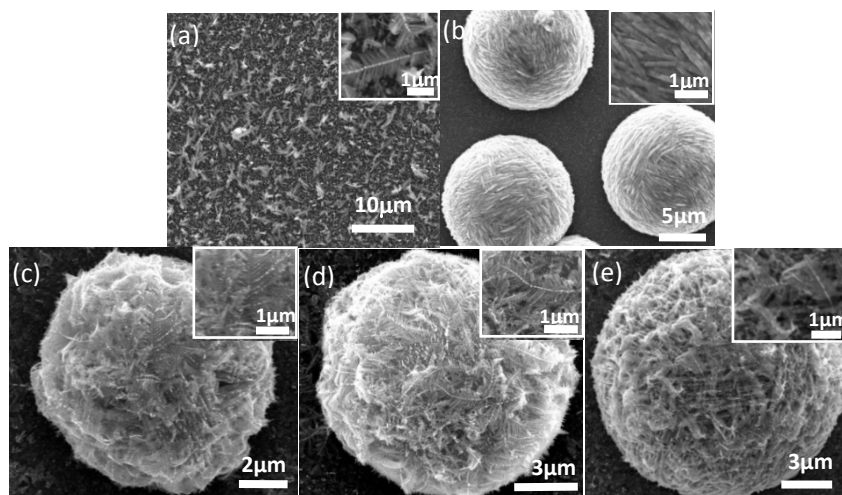


Fig. S2. SEM images of (a) silver dendritic structures; (b) Ag nanosheet-assembled microspheres; (c-e) Ag core-shell hierarchical microstructures deposited at 1.26 V, 1.11, 1.05V, respectively

Part S1 Estimation of enhancement factor

The SERS enhancement factor of the Ag core-shell hierarchical microstructure is estimated by calculating the ratios of the peak intensities of the SERS spectrum of R6G molecule on as-prepared sample (red curve in Fig. 5b) to the corresponding normal Raman spectrum of R6G molecule on FTO-coated glass (black curve in Fig. 5b):

$$EF = \frac{I_{SERS} / N_{SERS}}{I_{Ref} / N_{Ref}} \quad (1)$$

Where

I_{SERS} is the peak intensity of the SERS spectrum,

I_{Ref} is the peak intensity of normal Raman spectrum

N_{SERS} is the number of R6G molecules illuminated by the laser on the as-prepared sample substrate

N_{Ref} is the number of R6G molecules illuminated by the laser on the pure FTO-coated glass substrate

For the R6G film on the pure FTO-coated glass (1.5mm×1.8mm), the diameter of laser spot is 2μm, so the value of N_{Ref} was gotten as $10^{-3} \times 2 \times 10^{-5} \times 6.02 \times 10^{23} \times \pi (2\mu\text{m}/2)^2 / (1.5 \times 1.8)\text{mm}^2 = 4.46 \times 10^9$. In a similar way, the value of N_{SERS} was 44.6. For the band at 612cm^{-1} , I_{SERS}/I_{Ref} was 1.6. Therefore average enhancement factor for the band at 612cm^{-1} is estimated to be 1.6×10^8 . For other bands, the enhancement factor may be more than 10^8 because of higher value of I_{SERS}/I_{Ref} .

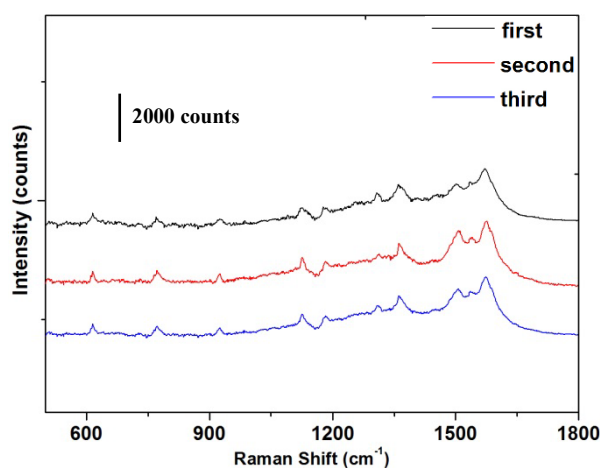


Fig. S3 Raman spectra of R6G (10-12 M) adsorbed on the samples treated by plasma cleaning