Electronic Supplementary Material (ESI) for RSC Advances
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Supporting Information

Periodic silver nanodishes as sensitive and reproducible surface-enhanced Raman scattering substrates

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Fig. S1 to S3

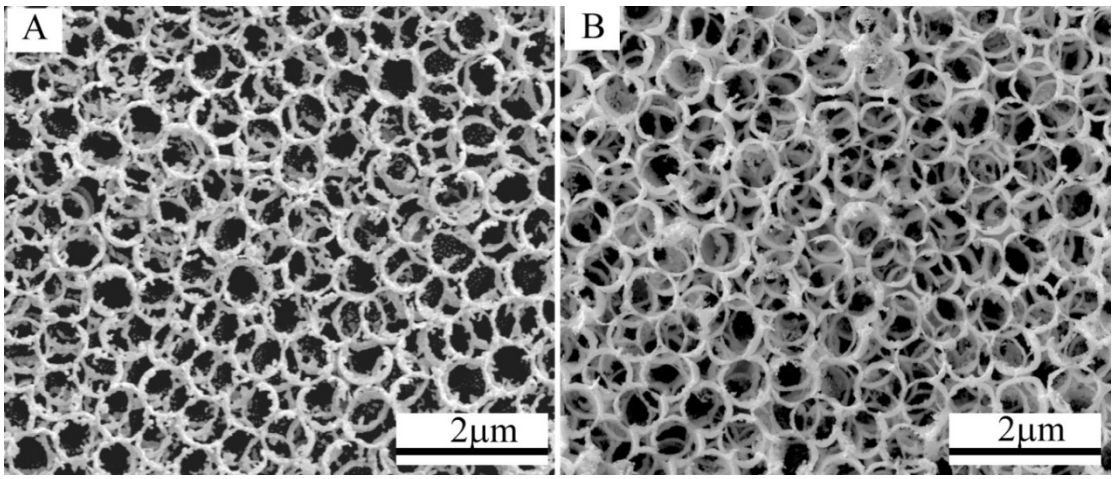

Fig. S1 The silver nanorings folded into (A) two layers and (B) multilayers

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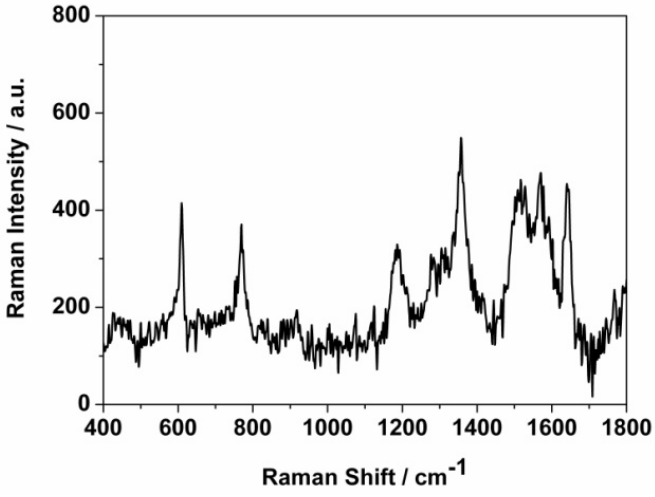

Fig. S2 Raman spectrum of R6G powder with laser power of 5 mw and collection time of 2 s.

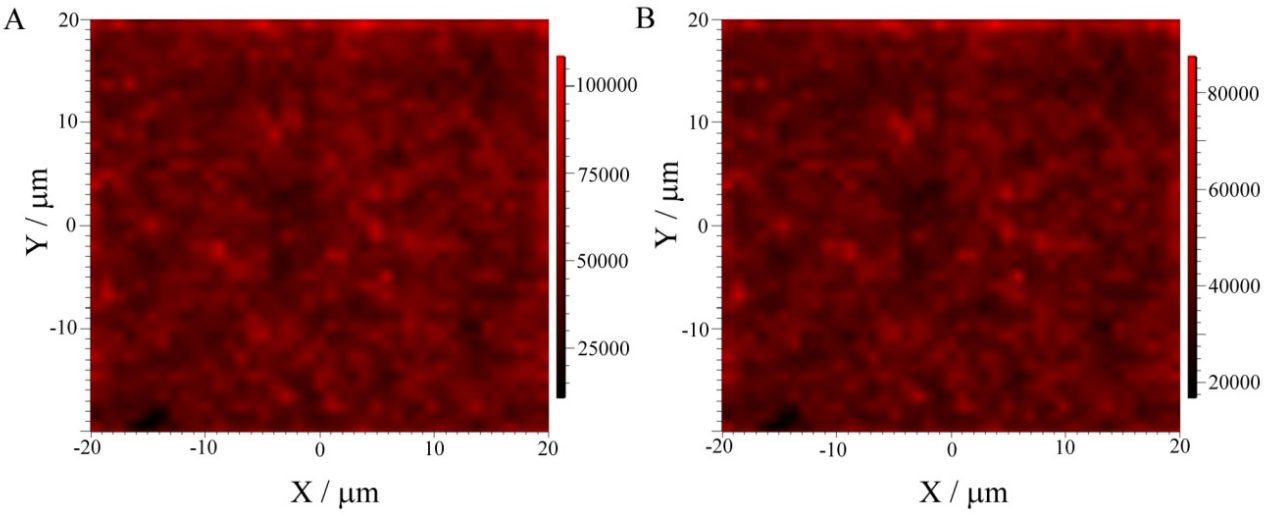

Fig. S3 SERS maps (40 μm×40 μm) of the 611 and 1360 cm^{-1} bands of R6G observed from the silver nanodishes.

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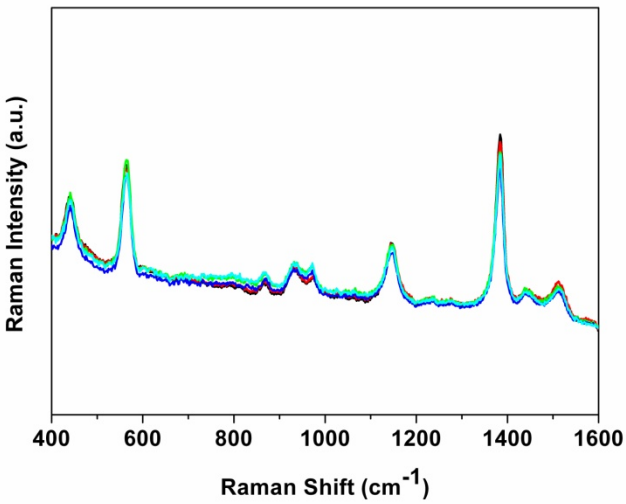

Fig. S4 SERS spectra of thiram (1×10^{-6} M) adsorbed on the nanodishes at 5 different spots.

Enhancement factor estimation:

The average enhancement factor (EF) value of the silver nanodishes relative to R6G powder is calculated according to the following formula:

$$EF=\frac{I_{SERS}(normalized)}{I_{bulk}(normalized)}\times\frac{N_{bulk}}{N_{SERS}}=\frac{I_{SERS}}{I_{bulk}}\times\frac{P_{bulk}}{P_{SERS}}\times\frac{T_{bulk}}{T_{SERS}}\times\frac{N_{bulk}}{N_{SERS}} \quad (1)$$

Where I_{SERS} is the SERS intensity measured from the substrate (spectrum a in Fig. 4) and I_{bulk} is the normal Raman intensity measured from the R6G solid powder (Fig. S2). P_{SERS} and P_{bulk} are the laser spot power. T_{SERS} and T_{bulk} are the recording time. For the band at 611 cm^{-1}, I_{SERS} / I_{bulk} was 294. N_{SERS} and N_{bulk} are the probe molecule numbers illuminated by the laser spot, N_{SERS} can be calculated as:

$$N_{SERS}=C\times V_{solution}\times\frac{S_{laser}}{S_{sub}} \quad (2)$$

Where C is the molar concentration of the R6G solution, $V_{solution}$ is the volume of the droplet, S_{laser} is the area of the laser spot, S_{sub} is the whole area of substrate. Assuming that the excitation volume as a cylinder, N_{bulk} can be expressed as:

$$N_{bulk}=S_{laser}\times h\times\frac{\rho}{m} \quad (3)$$

Where h is the focus length of the laser (about 2.1 μm), ρ and m are the density of solid R6G (1.2 g/cm^3) and its molecular weight (479.01 g/mol), respectively. According to the experimental condition, the N_{bulk} / N_{SERS} is estimated to be 4.2×10^4. Therefore, the average EF for the band at 611 cm^{-1} is calculated to be 6.17×10^7.