

Supporting Information

Ultrasensitive SERS Performance in 3D “Sunflower-like” Nanoarrays decorated with Ag Nanoparticles

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Supplementary Information

- **Figure S1.** SEM images of large-area monolayer PS nanospheres template (a), (b) and monolayer silica spheres template (c), (d).
- **Figure S2.** SEM images of SLNAs (2 μm silica spheres and 290 nm PS nanospheres), different times in oxygen plasma treatment, the etching durations of the panels (a), (b), (c), (d), and (e) are 0, 5, 9, 13, and 17 min correspondingly. The panel (f) shows a large area of SLNAs (2 μm silica spheres and 290 nm PS nanospheres). And the insets of the panels (a), (b), (c), (d), and (e) are the magnified cross-sectional pictures correspondingly.
- **Figure S3.** SEM images of SLNAs-Ag which before immersed the R6G solutions and after the Raman tests.
- **Figure S4.** SEM images of SLNAs-Ag with different thicknesses (2 μm silica spheres and 290 nm PS nanospheres, the etching time is 5 min), the sputtering times of Ag film

in the panels (a), (b), (c), and (d) are 300 s, 450 s, 600 s, and 750s correspondingly. (e)

The SERS spectra of 5×10^{-7} M R6G aqueous solution on the serious samples.

- **Figure S5.** SEM images of SLNAs-Ag (2 μm silica spheres and 115 nm PS nanospheres, the sputtering time of Ag film is 600 s), different times in oxygen plasma treatment, the etching durations of the panels (a), (b), (c), (d), and (e) are 0, 1, 3, 5, and 7 min correspondingly. (f) Detection of R6G (5×10^{-7} M)-SERS spectra from different samples.
- **Figure S6.** SEM images of SLNAs-Ag (800 nm silica spheres and 115 nm PS nanospheres, the sputtering time of Ag film is 600 s), different times in oxygen plasma treatment, the etching durations of the panels (a), (b), (c), (d), and (e) are 0, 1, 3, 5, and 7 min correspondingly. (f) Detection of R6G (5×10^{-7} M)-SERS spectra from different samples.
- **Figure S7.** The optical image of two randomly selected areas of $18 \times 18 \mu\text{m}^2$ and $35 \times 35 \mu\text{m}^2$ were respectively shown in the panel (a) and (c). The Raman mappings of the arrays immersed on 10^{-8} M R6G was correspondingly shown in panel (b) and (d), and the Raman intensity was chosen at 1360 cm^{-1} .

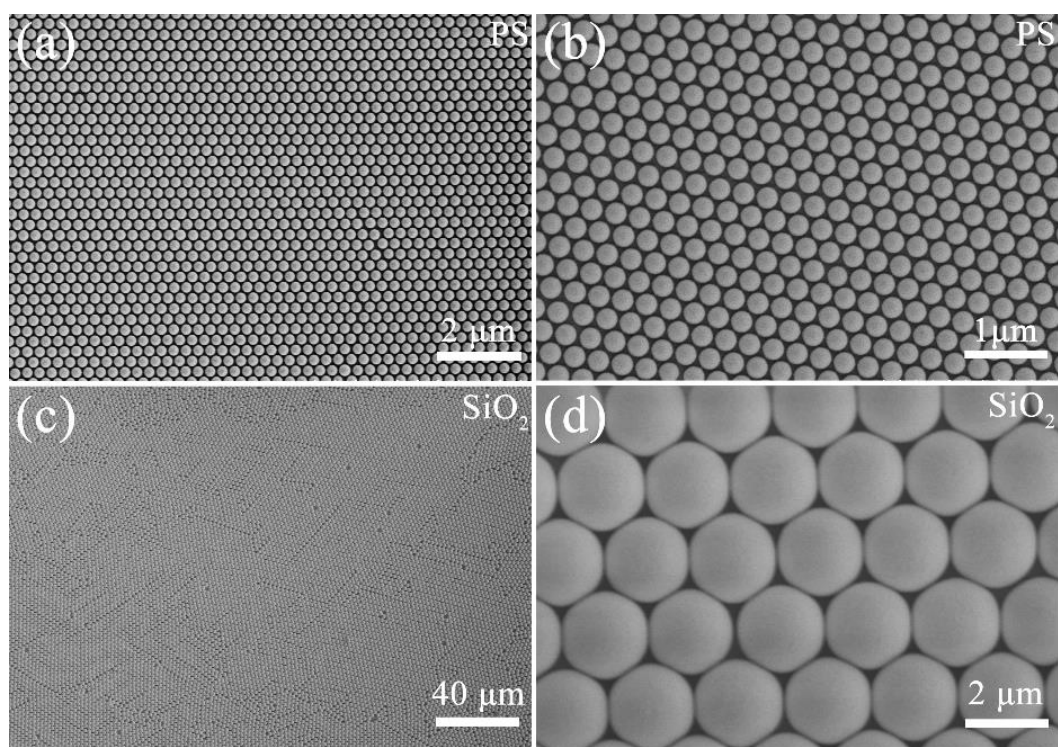


Figure S1 SEM images of large-area monolayer PS nanospheres template (a), (b) and monolayer silica spheres template (c), (d).

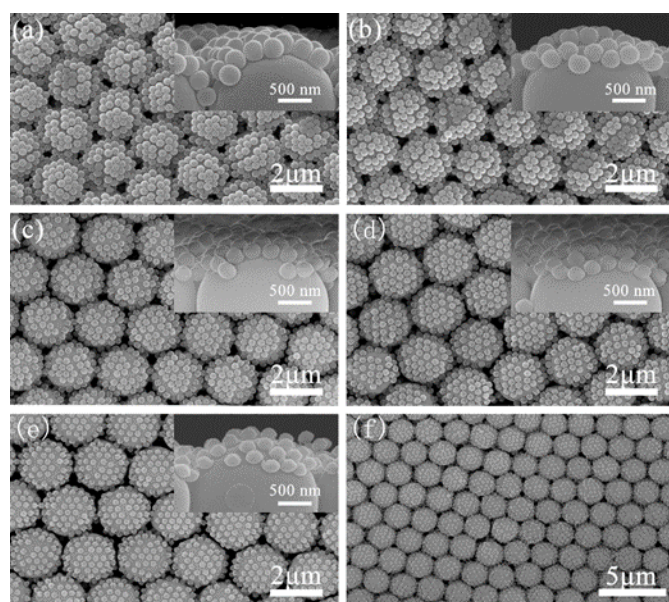


Figure S2 SEM images of SLNAs (2 μm silica spheres and 290 nm PS nanospheres), different times in oxygen plasma treatment, the etching durations of the panels (a), (b), (c), (d), and (e) are 0, 5, 9, 13, and 17 min correspondingly. The panel (f) shows a large area of SLNAs (2 μm silica spheres and 290 nm PS nanospheres). And the insets of the panels (a), (b), (c), (d), and (e) are the magnified cross-sectional pictures correspondingly.

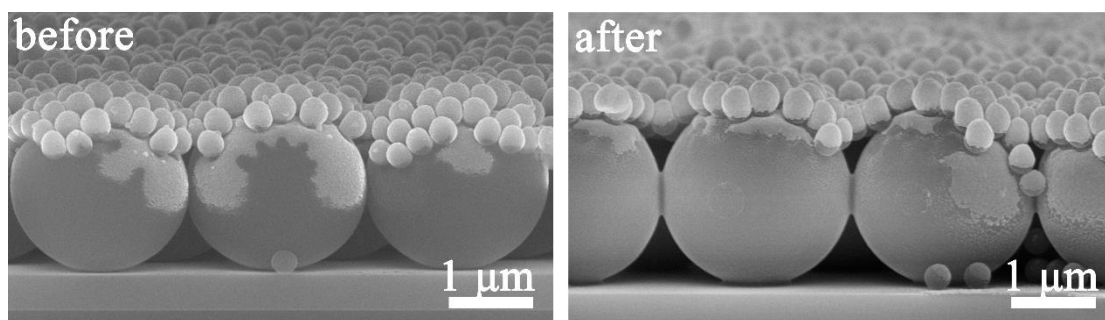


Figure S3 SEM images of SLNAs-Ag which before immersed the R6G solutions and after the Raman tests.

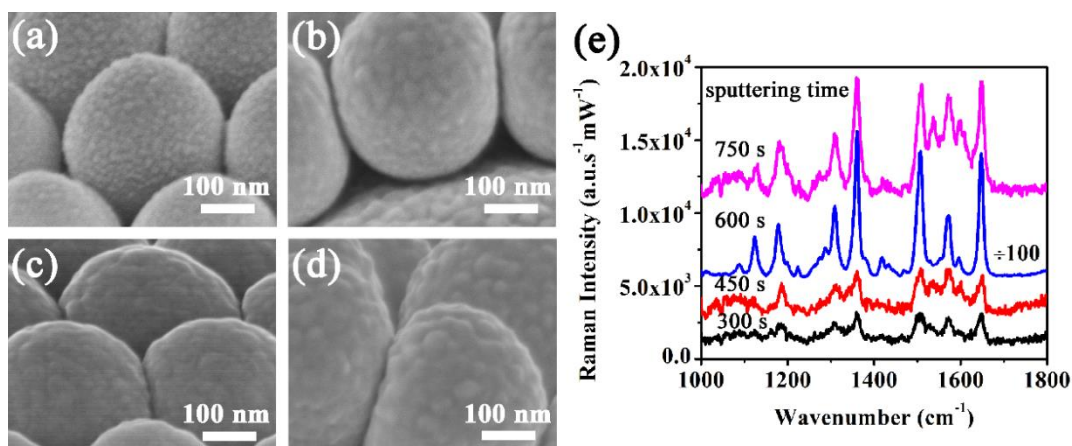


Figure S4 SEM images of SLNAs-Ag with different thicknesses (2 μm silica spheres and 290 nm PS nanospheres, the etching time is 5 min), the sputtering times of Ag film in the panels (a), (b), (c), and (d) are 300 s, 450 s, 600 s, and 750 s correspondingly. (e) The SERS spectra of 5×10^{-7} M R6G aqueous solution on the serious samples.

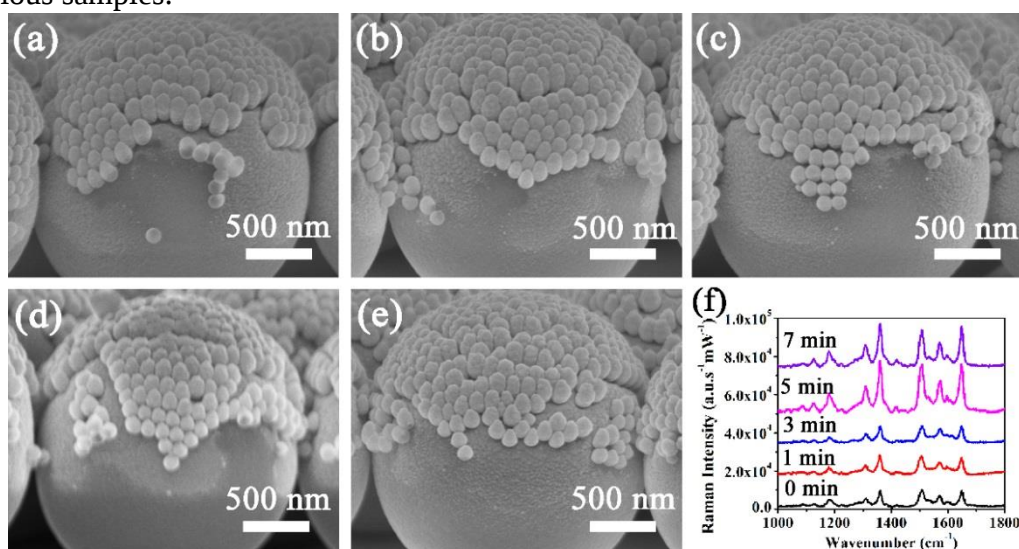


Figure S5 SEM images of SLNAs-Ag (2 μm silica spheres and 115 nm PS nanospheres, the sputtering time of Ag film is 600 s), different times in oxygen plasma treatment, the etching durations of the panels (a), (b), (c), (d), and (e) are 0, 1, 3, 5, and 7 min correspondingly. (f) Detection of R6G (5×10^{-7} M)-SERS spectra from different samples.

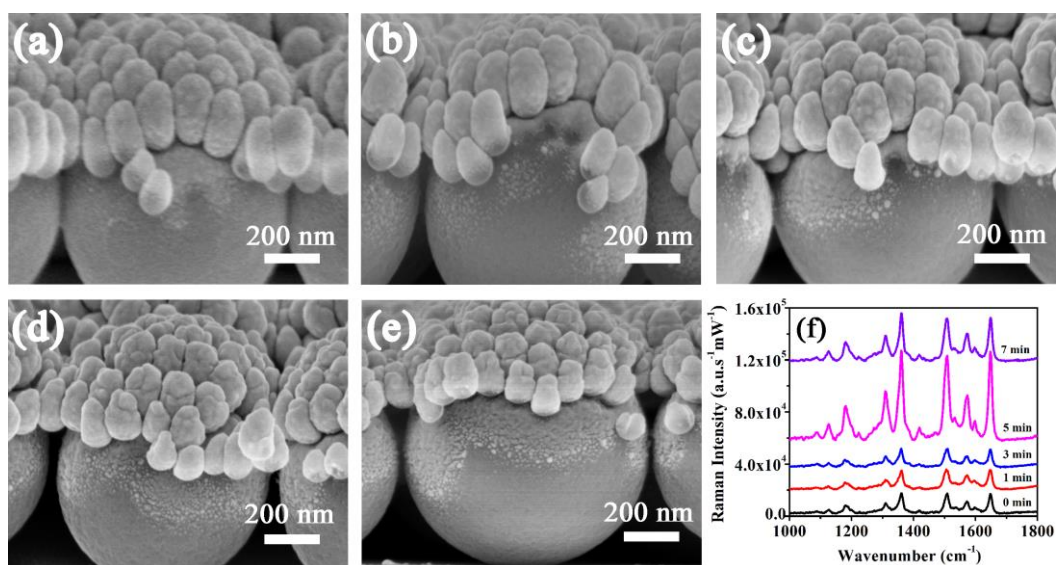


Figure S6 SEM images of SLNAs-Ag (800 nm silica spheres and 115 nm PS nanospheres, the sputtering time of Ag film is 600 s), different times in oxygen plasma treatment, the etching durations of the panels (a), (b), (c), (d), and (e) are 0, 1, 3, 5, and 7 min correspondingly. (f) Detection of R6G (5×10^{-7} M)-SERS spectra from different samples.

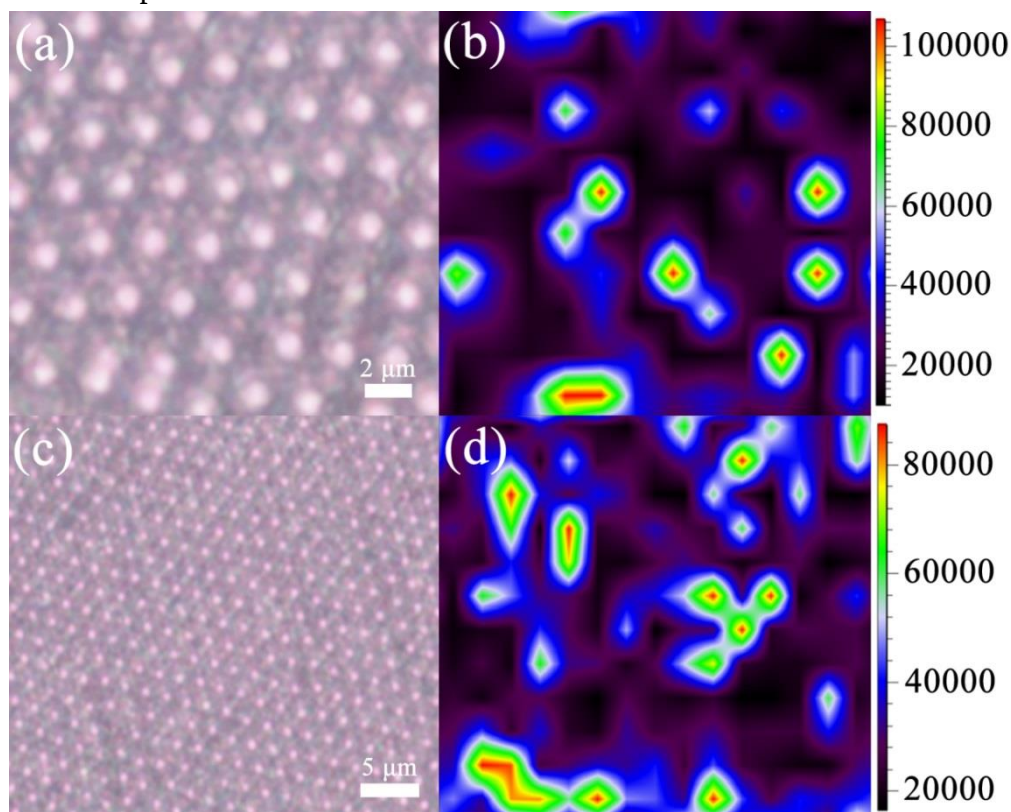


Figure S7 The optical image of two randomly selected areas of $18 \times 18 \mu\text{m}^2$ and $35 \times 35 \mu\text{m}^2$ were respectively shown in the panel (a) and (c). The Raman mappings of the arrays immersed on 10^{-8} M R6G was correspondingly shown in panel (b) and (d), and the Raman intensity was chosen at 1360 cm^{-1} .