Supplementary information

Figure S1

The process for forming the FlexiSERS and its use. (a) Formation of a nanosphere monolayer. (b) Transfer of the monolayer onto adhesive tape attached to a thumbtack. (c) Photograph of a glass slide after nanosphere transfer. (d) Silver deposition. (e) Detection of surface-adsorbed target molecules on orange. (f) Photographs of the FlexiSERS and its storage tube.

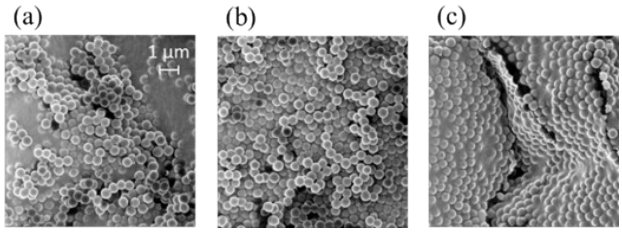

Figure S2

HIM images of 400 nm nanospheres on the FlexiSERS after transfer under various pressures, corresponding to 10, 30, and 500 g for (a), (b) and (c) respectively on tape 7.

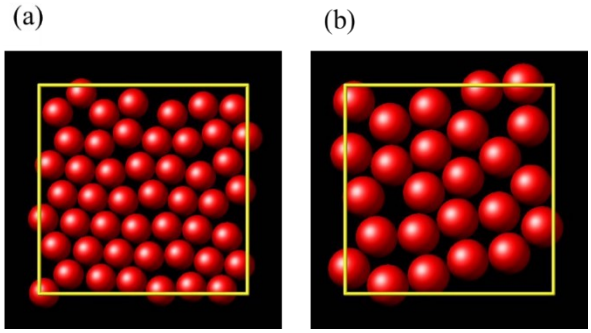

Figure S3

Examples of the particle alignment for FDTD calculations for (a) d = 600 nm and (b) d = 900 nm.

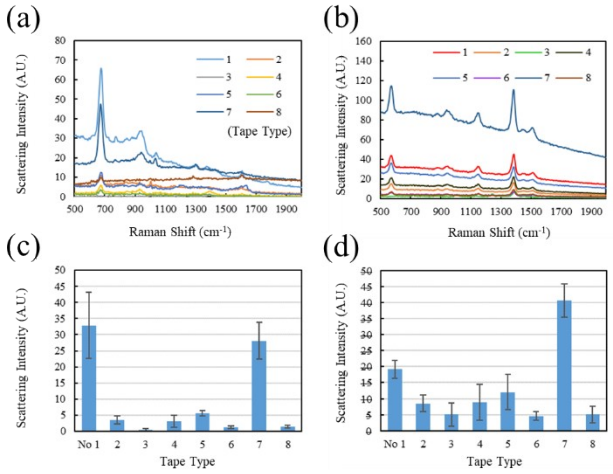

Figure S4

Effect of using different commercial tapes, tapes 1~8, for preparation of the FexiSERS on SERS spectra. (a) MM vapor, (b) Immersion into a 100 ppm ferbam solution, (c) the 675 cm^{-1} peak intensity of MM, (d) the 1387cm^{-1} peak intensity of ferbam.

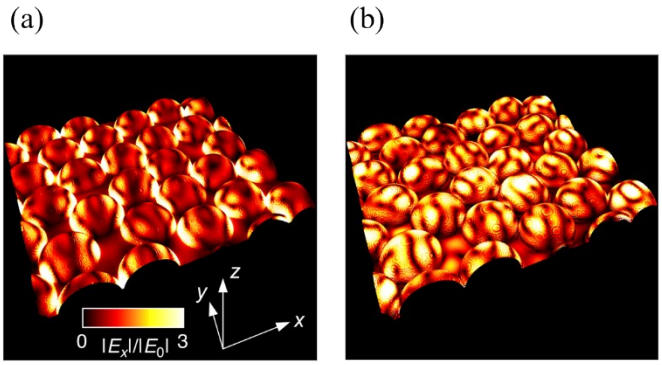

Figure S5

FDTD calculations based on randomly adsorbed nanospheres. They are obtained with the same method as Figs. 4 (b) and (c) but with the diameter of the silica particles being 700 nm, i.e. d = 900 nm. The color scale shown in both figures is identical to that for Figs. 4 (b) and (c).

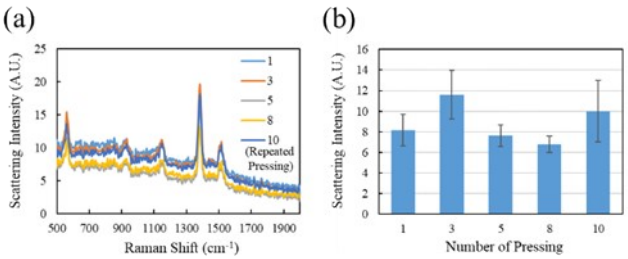

Figure S6

Effect of the number of times the FlexiSERS was pressed onto orange on ferbam SERS spectra. (a) Superimposed SERS spectra of 100 ppm ferbam. (b) Bar graph of the 1387 cm^{-1} peak. The number of measurements was 15.

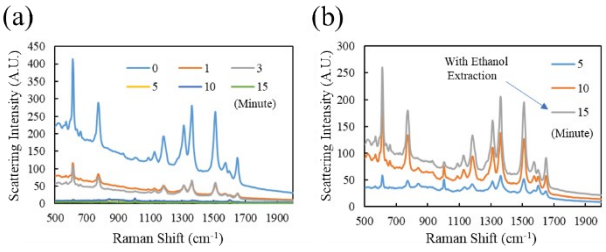

Figure S7

Effect of drying and extraction with addition of ethanol on R6G SERS spectra. (a) A drop of 0.1 mM R6G solution was placed on cardboard. SERS spectra were obtained by pressing the FlexiSERS on cardboard. (b) SERS spectrum could be recovered with ethanol extraction

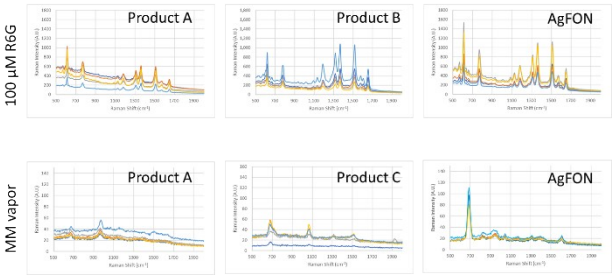

Figure S8

Spectra of 100 µM R6G (top row) and saturated MM vapor (bottom row) using two best substrates out of the six commercial products we evaluated. Those on the right were obtained with our AgFON on a glass slide. Incidentally they were all silver substrates.

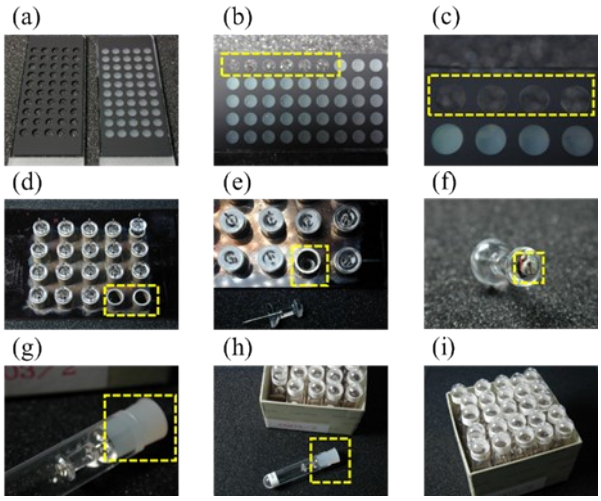

Figure S9

Protocol for mass production. (a) Fifty spots covered by nanospheres on the slide on the right scatter light more. (b) Nanospheres transferred from six spots in the left upper corner. (c) Close-up of (b). (d) Jig for silver evaporation. (e) Bottom of an empty well. (f) A finished FlexiSERs. (g) Rubber plug sealing a Ar-filled plastic tube (h). (i) FlexiSERS stored for future use.

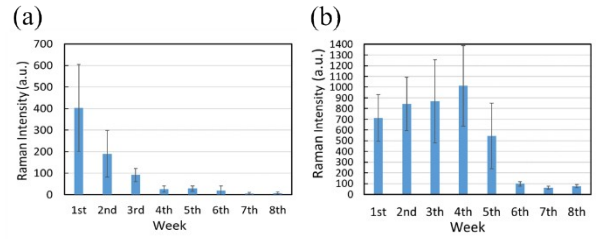

Figure S10

Temporal change in the 1560 cm^{-1} peak intensity of R6G SERS spectra with the FlexiSERS in air (a) and Ar-filled tubes (b).