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Supporting information

Metal-elastomer nanostructures for tunable SERS and easy microfluidic integration

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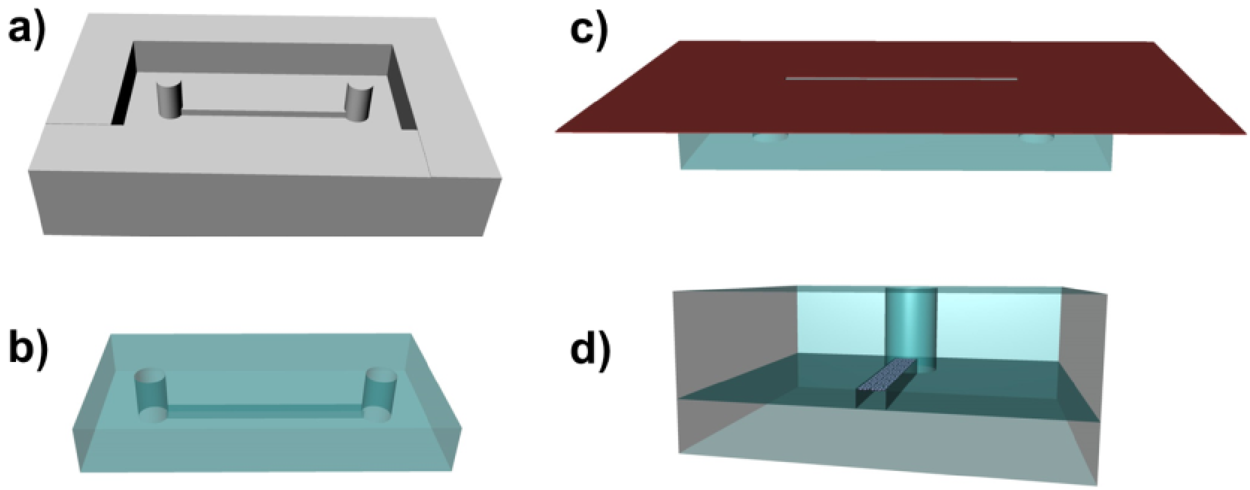

Figure S1. 3D schematic of the fabrication process: (a) PMMA master fabrication by milling, (b) replication by PDMS casting, curing and removal, (c) Ag NPs sputtering into the microchannel by hard masking, (d) cross-section of the microfluidic cover bonded with a planar PDMS slab by stamp and stick method.

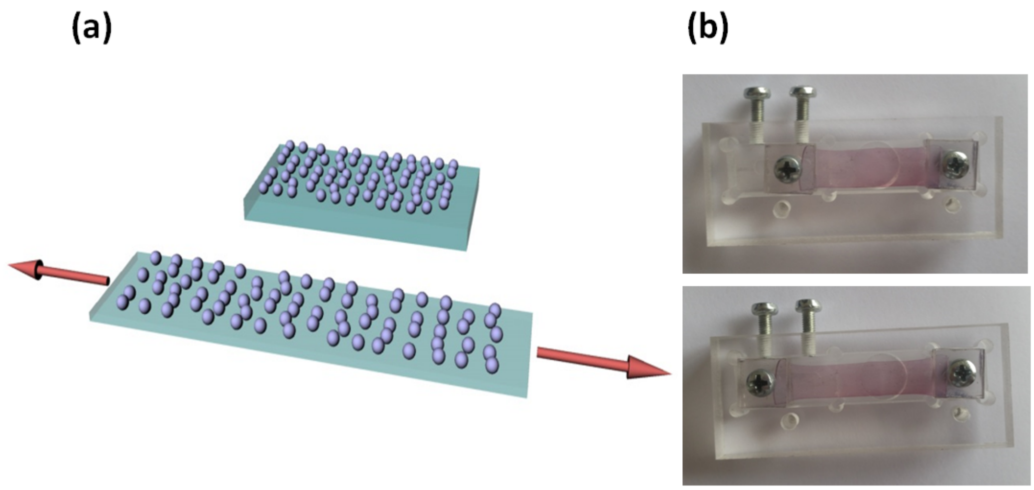

Figure S2. (a) Scheme of a typical Ag-coated PDMS membrane subjected to external strain. (b) Customized tensile strain device clamping the metal-elastomeric membrane.

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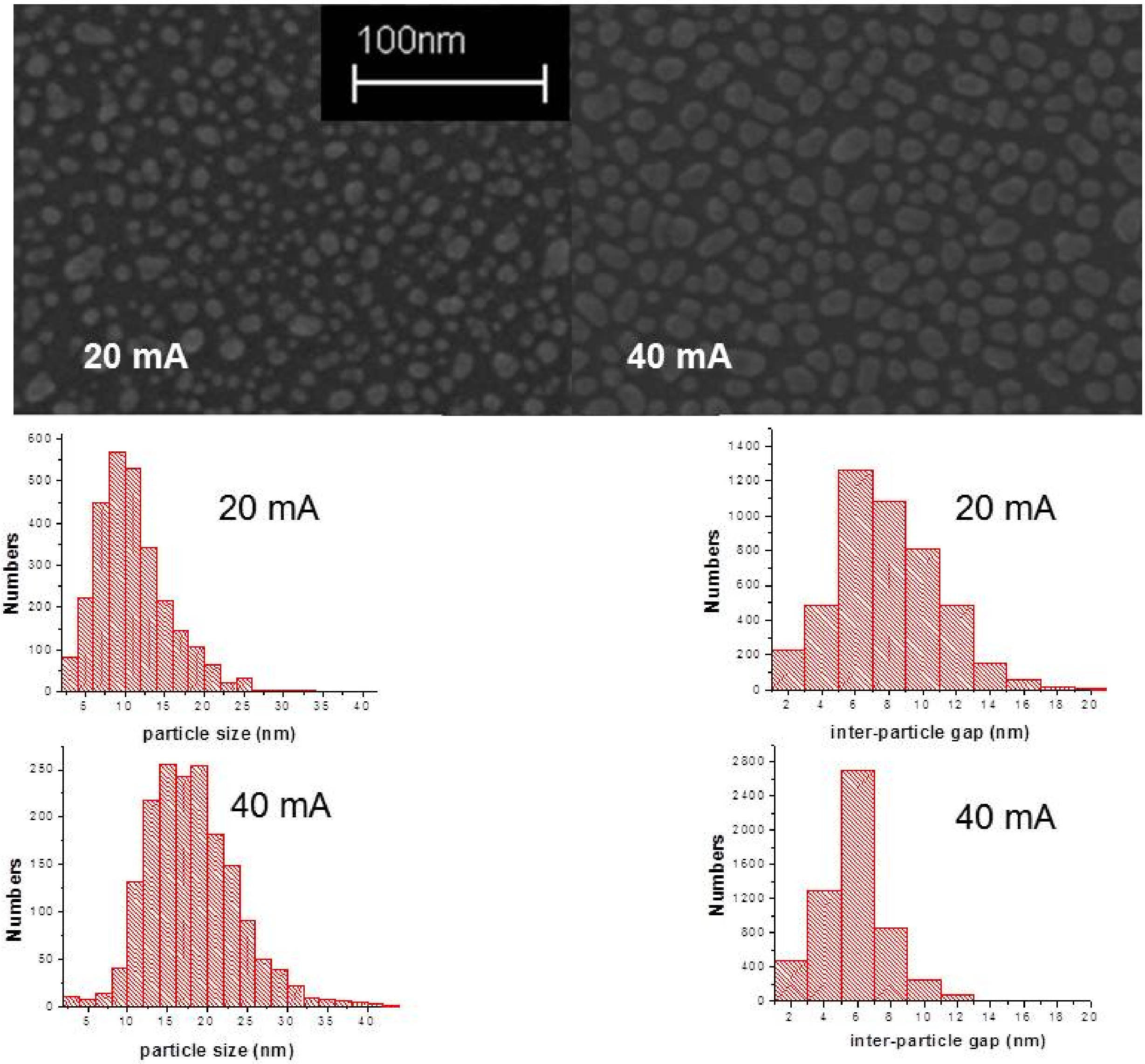

Figure S3. FESEM micrographs of Ag nanoparticles obtained by d.c. sputtering at 20 mA (a) and 40 mA (b) on c-Si. Distributions of nanoparticles size and gaps between neighboring particles are also shown.

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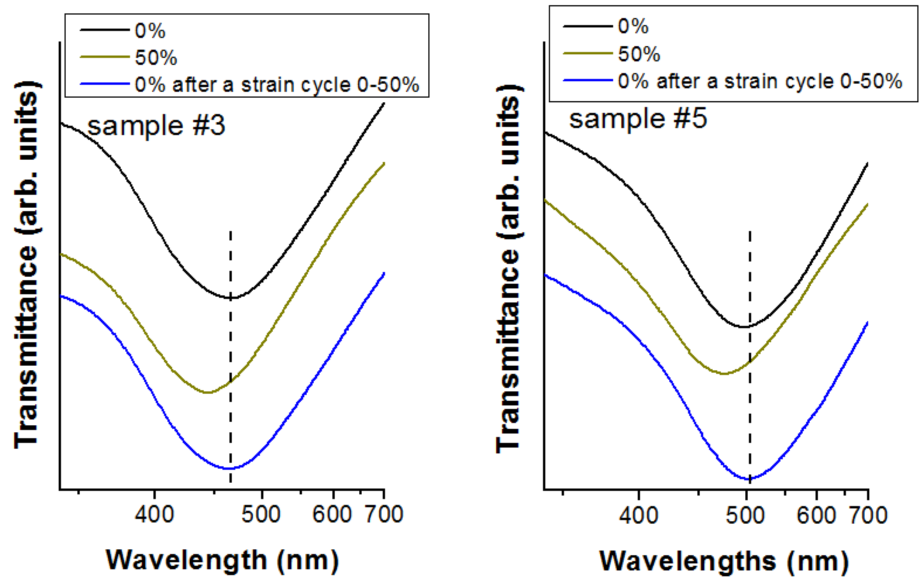

Figure S4. Transmittance spectra of representative silvered PDMS membranes under a cycle of external strain (0% → 50% → 0%). The samples do not evidence any hysteresis behavior. The spectra are vertically shifted for clarity.

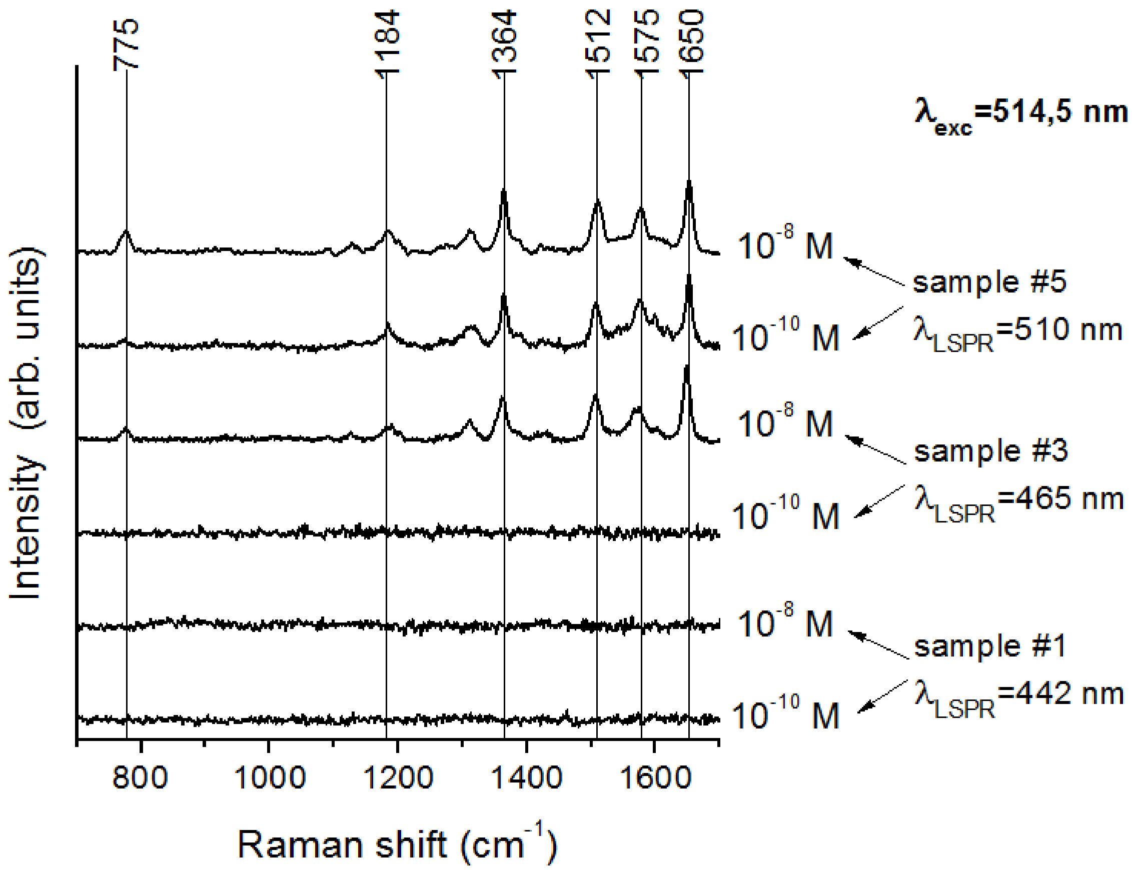

Figure S5. Raman spectra of R6G in ethanolic solution at a concentration of 10^{-8} M and 10^{-10} M adsorbed on samples #1, #2, #3. It is straightforward to notice as the Raman detection threshold increases as the plasmon resonance of the metal-elastomeric nanostructure (reflectance dip) moves away from the laser excitation wavelength.

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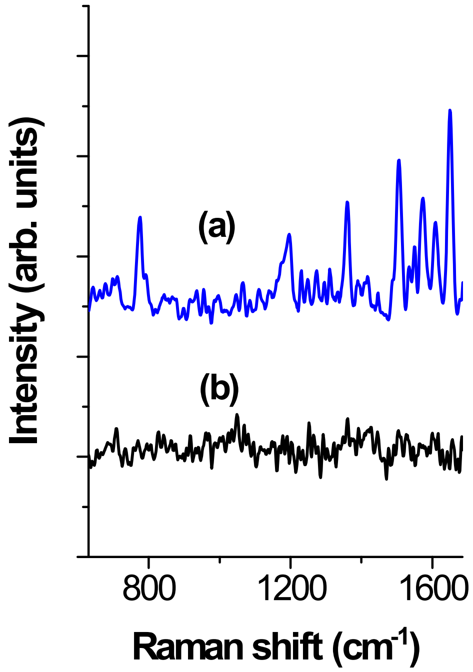

Figure S6. Raman spectra of R6G at a concentration of 10^{-8} M injected in the microfluidic device: (a) excitation at 514.5 nm on unstretched chip, (b) excitation at 514.5 nm on stretched chip (50% strain).

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