

Surface-enhanced Raman spectroscopy on porous silicon membranes decorated by Ag nanoparticles integrated in elastomeric microfluidic chips

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S1. Schematic project of the cover mold

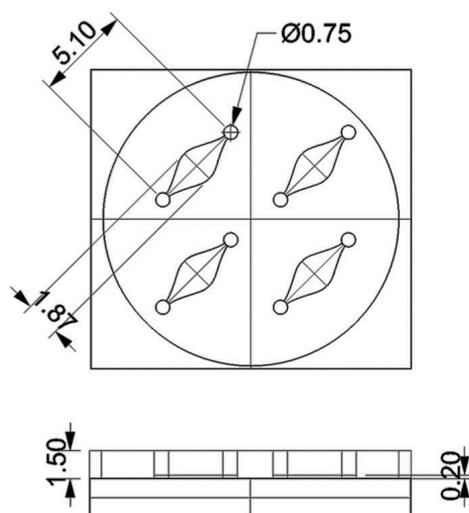


Figure S1. Schematic top view and cross section of the cover mold. Heights and widths of the chambers and inlet/outlet channel are expressed in millimetres.

S2. Scheme of fabrication

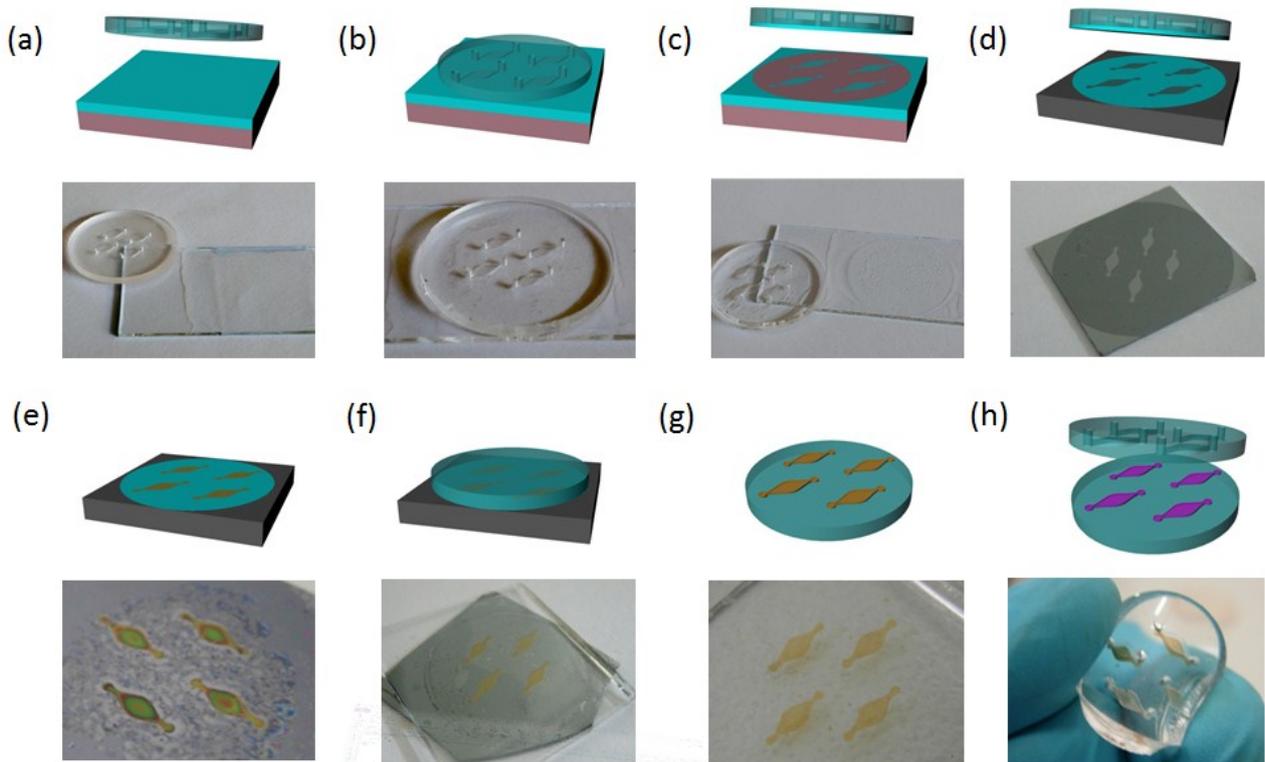


Figure S2. (a) PDMS precursors mixture spreading on a smooth surface (i.e. glass slide); (b) PDMS cover (hosting drop-shaped chambers) placed in contact with the mixture; (c) cover removal; (d) stamp of the cover pattern on the silicon dice; (e) patterned pSi membranes after HF anodization; (f) partially cross-linked PDMS in contact with the pSi membranes; (g) pSi membranes detachment and transfer onto the PDMS substrate; (h) expanded vision of the silver-coated optofluidic chip. Each step is shown along with the corresponding digital photograph.

S3. Field Emission Scanning Electron Microscopy of the porous silicon membranes

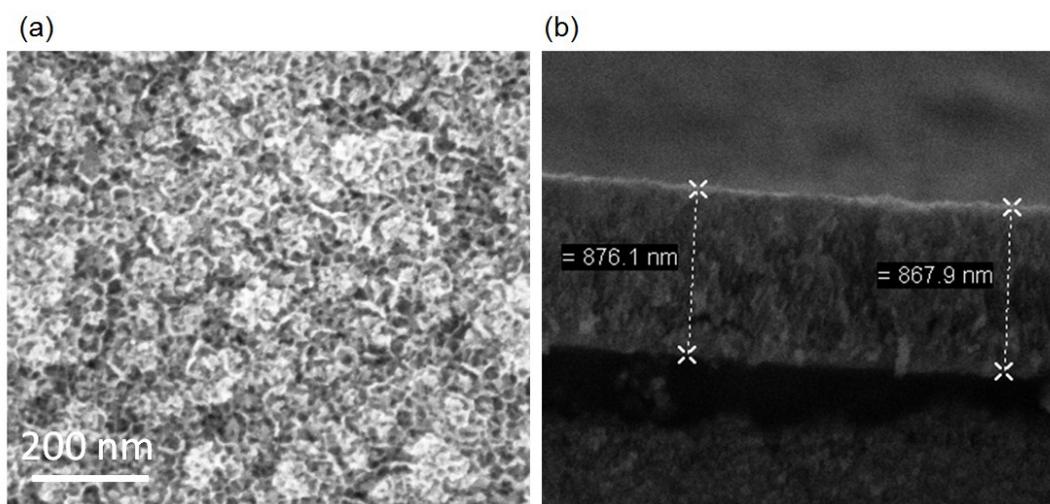


Figure S3. FESEM microrgraphs of the porous silicon membrane. Images were acquired on the membrane directly transferred onto the conductive tape used for FESEM measurements. (a) Top view (b) Cross section

S.4 Electronic absorption spectrum of 4-mercaptobenzoic acid

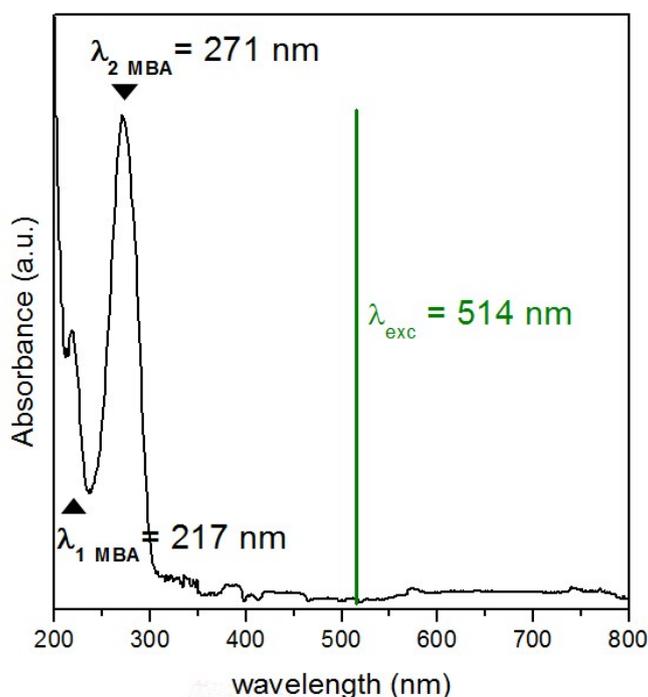


Figure S4. UV-Vis absorption spectrum of a 10^{-3} M ethanol solution of 4-MBA. Main absorptions of 4-MBA are attributed to the non-bonding highly polarizable S electrons ($\lambda_1 = 217$ nm) and to the conjugate S-ring-carboxylic group system ($\lambda_2 = 271$ nm).¹ The green line at 514 nm indicates the laser excitation wavelength employed for SERS experiments.

S5. 4-MBA SERS spectra

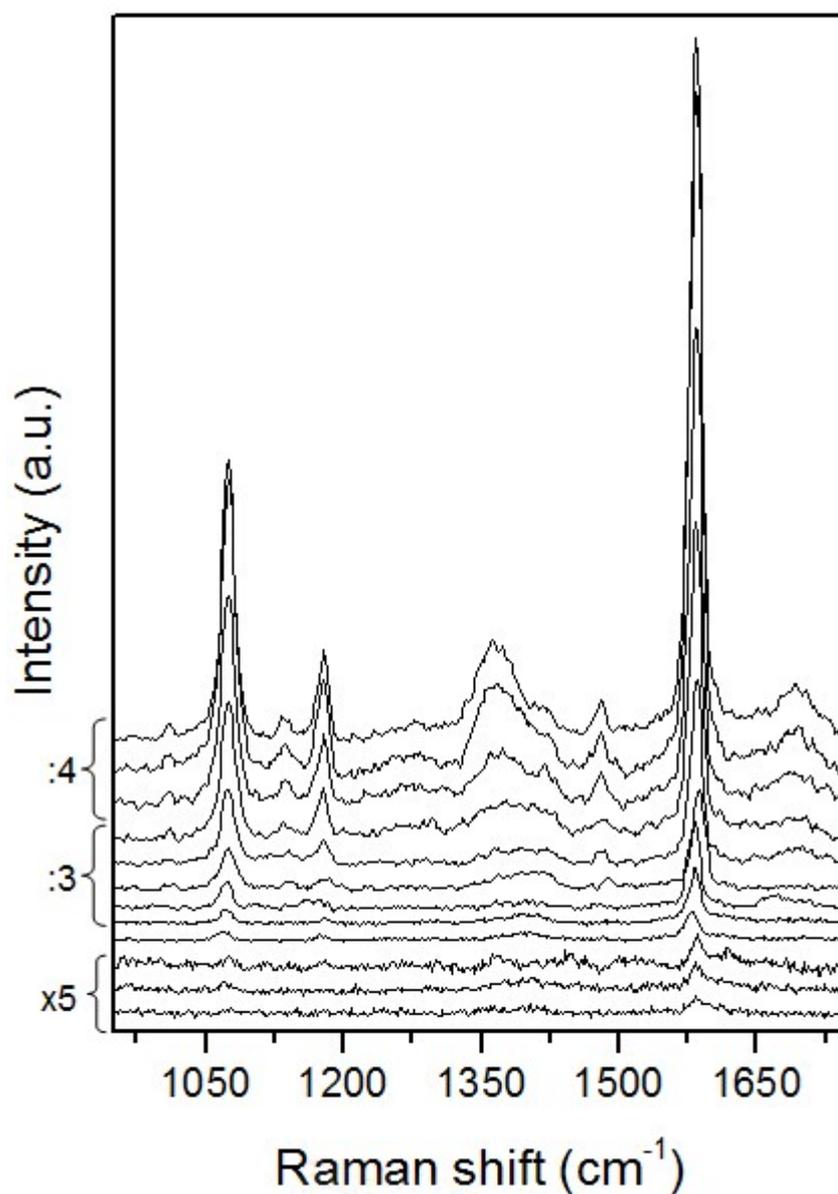


Figure S5. Single representative SERS spectra of 4-MBA at increasing concentrations (from below): 10^{-8} M, $5 \cdot 10^{-8}$ M, 10^{-7} , $5 \cdot 10^{-7}$ M, 10^{-6} , $5 \cdot 10^{-6}$ M, 10^{-5} , $5 \cdot 10^{-5}$ M, 10^{-4} , $5 \cdot 10^{-4}$ M, $5 \cdot 10^{-3}$ M, 10^{-2} M. Spectra were rescaled according to the factors indicated on the left of the graph.

¹ E. Campaigne, W.W. Meyer, *J. Org. Chem.*, 1969, **27**, 2835.