

## Supplementary information for

# Polycarbonate microchannel network supporting Gold NanoWires 3-D Arrays for SERS-active microchip

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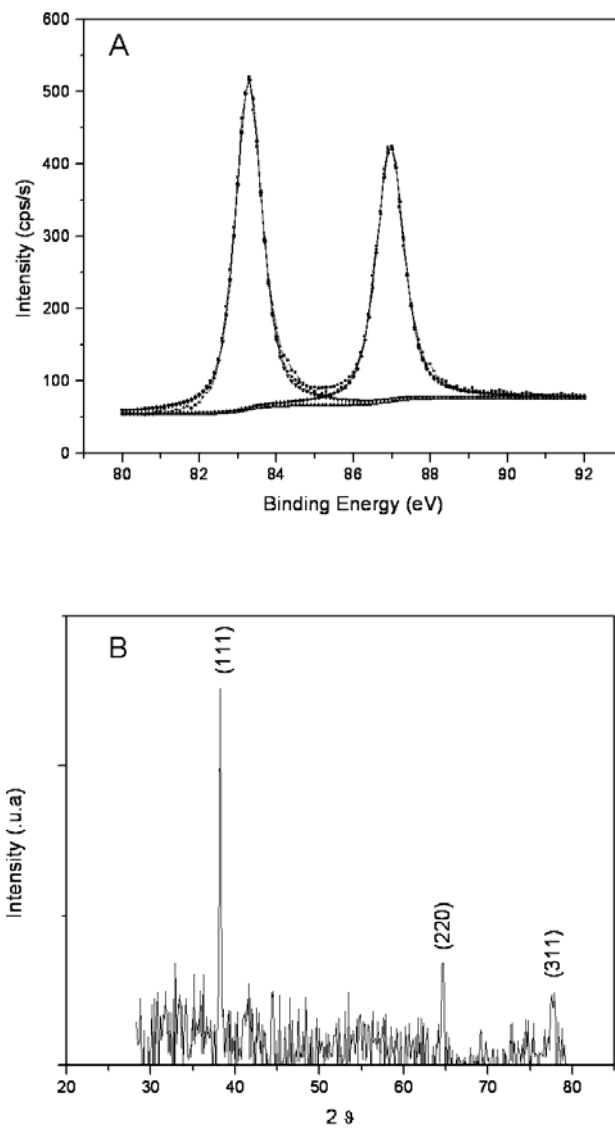
## Materials and methods

Random arrays of gold nanowires were made by electrodeposition into a track etched polycarbonate (30  $\mu\text{m}$  thick). A thin gold film was sputtered on one side of the porous membranes to serve as cathode. The growth was performed at 55°C in a conventional one-compartment cell with three electrode configurations: A gold wire acted as counter electrode, reference electrode of Ag/AgCl and the working electrode is the gold layer deposit on the polycarbonate. A solution of sodium gold (I) sulfite bath (Metakem) (gold content = 5 g L<sup>-1</sup>) was used to electrodeposit gold on 30  $\mu\text{m}$  thick polycarbonate membranes with a pore density of 10<sup>8</sup> pores per cm<sup>-2</sup> (pore diameter 200 nm). The deposition potential was -0.65 V vs Ag/AgCl. The nanopores filling was monitored by measuring the plating current. The deposition was stopped before the three-dimensional caps began to form on top of the few first emerging wires, which was revealed by a sudden increase of plating current. After removing the conductive gold layer, one layer of polyethylene-terephthalate (35  $\mu\text{m}$  thick) was laminated on each side. The PET/PC gold nanowires/PET system was exposed to an ArF excimer laser beam in order to define a 35  $\mu\text{m}$  deep cavity, which reaches the surface of the polycarbonate. We used argon plasma etching with an argon pressure of 380 mbar and a power of 100 W was applied for 4 hours in order to remove 15  $\mu\text{m}$  of polycarbonate (Figure 2C). Figure S1 (A) show the XP spectra of Au, we observed two peaks after fitting which are attributed the 4f7/2 and 4f5/2, (b) show the diffraction pattern of electrodeposited nanowires, the nanowires are polycrystalline fcc (111), (200) and (311). *In situ* Raman spectroscopy: Raman spectra are acquired with a Labram spectrophotometer from Horiba - Jobin Yvon equipped with a \*50 ULWD objective from Olympus. Laser light at 632.5nm is used to excite the spectrum with an output power set at 1mW with neutral density filter to avoid thermal

effects on the sample. All the spectra are taken with electrolyte covering the sample surface.

Acquisition time is set at 20-30s, depending on background intensity.

## Supplementary figures



**Figure S1.** (A) XP spectra of Au (4f) for Au nanowires. (B) X- Ray diffractograms of Au nanowires.