Electronic supplementary information

Transparent, conductive, and SERS-active Au nanofiber films assembled on an amphiphilic peptide template

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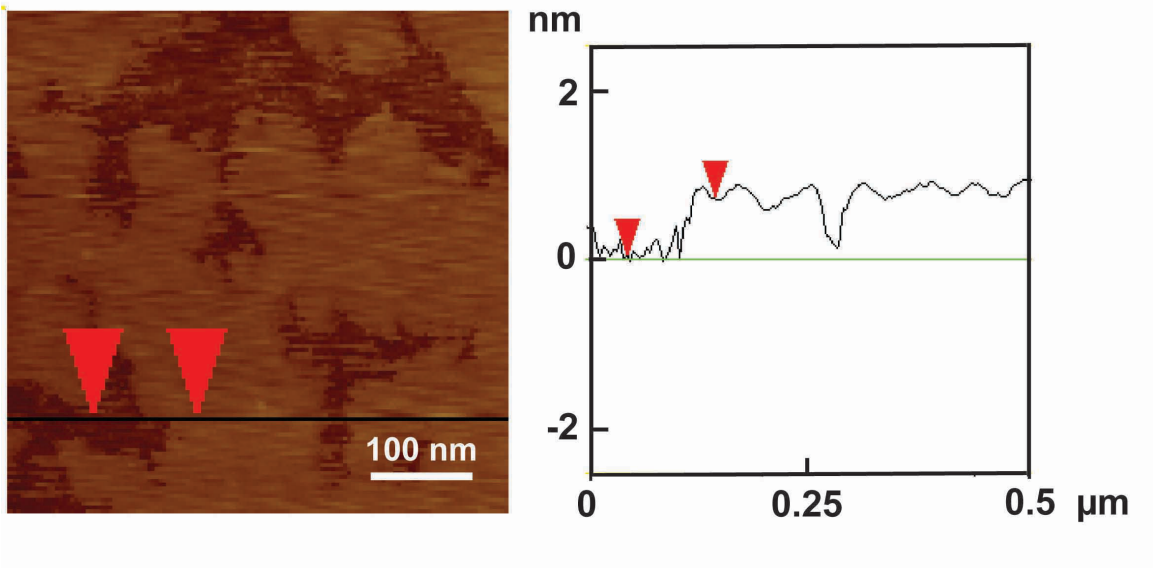

Fig. 1, ESI: AFM analysis of the peptide monolayer. AFM image and section analysis of a peptide monolayer transferred onto mica substrate from the air/water interface (subphase of 1M KCl at pH 5.5) at 15 mN/m surface pressure. The AFM section analysis indicates that the peptide forms a β-sheet *monolayer* on the water surface.

AFM analysis was done with a Dimension 3100 SPM from Digital Instruments (Veeco, NY, USA). For sample preparation, peptide monolayers were transferred to a freshly cleaved mica sheet through the Langmuir-Blodgett technique. Mica sheet was immersed vertically in the subpahse prior to the isothermal compression and was retracted from the subphase when the surface pressure reached 15mN/m. Speed of vertical movement of the dipper was 20 mm/min for the retraction.

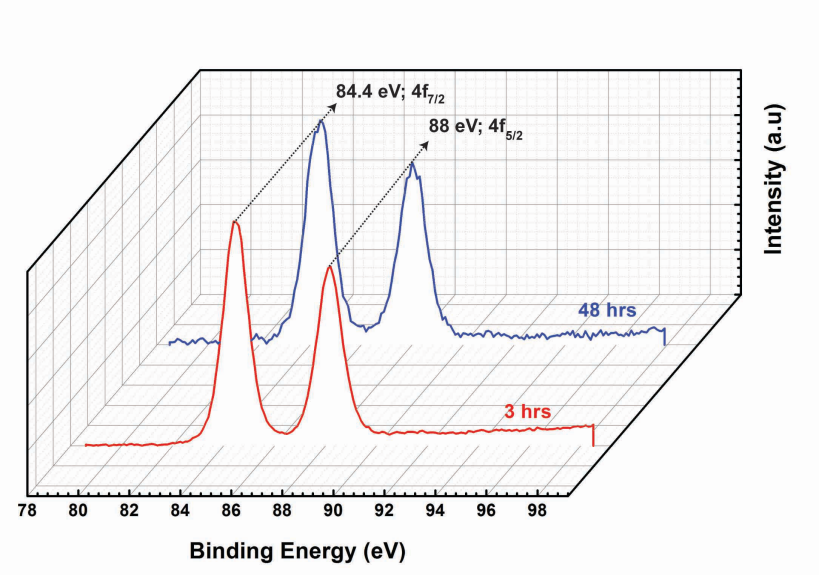

Fig. 2, ESI: XPS analysis. XPS spectra in the Au (4f) region obtained from gold nanofibers grown over TEM grids at different incubation times with gold complex solution.

XPS analysis was carried out using Thermo Fisher ESCALAB 250 instrument with a basic pressure of $2 \cdot 10^{-9}$ mbar. The samples were irradiated in two different areas using monochromatic Al Kα, 1486.6 eV X-rays, using a beam size of 500 μm.

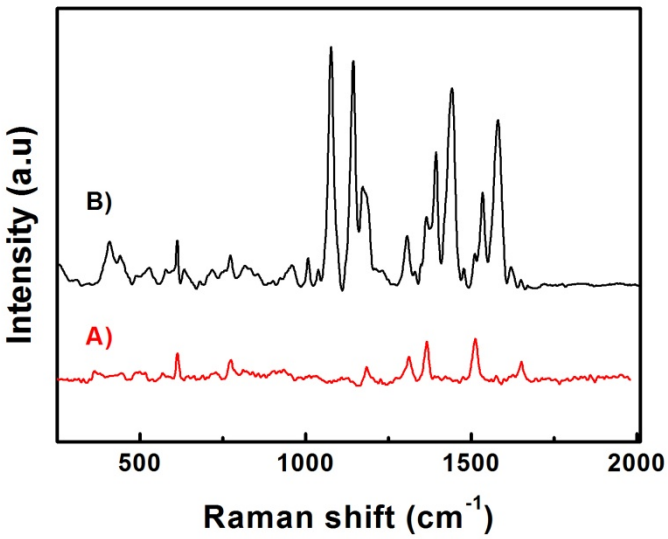

Fig. 3, ESI: (A) Normal Raman spectra of a 10^{-3}M aqueous solution of R6G excited with a 633 nm radiation; (B) SERS of 10^{-6} M solution of R6G placed over gold substrate and excited with a 633 nm radiation.

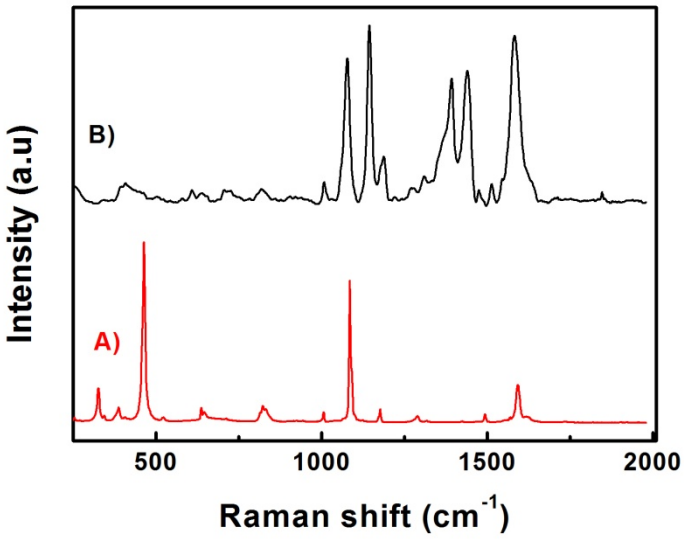

Fig. 4, ESI: (A) Normal Raman spectra of a solid grain of PATP excited with a 633 nm radiation; (B) SERS of 10^{-6} M solution of PATP placed over gold substrate and excited with a 633 nm radiation. It should be noted that the spectrum for solid PATP can be significantly different from that of PATP molecules adsorbed on a surface according to literature (e.g. Ref 41).

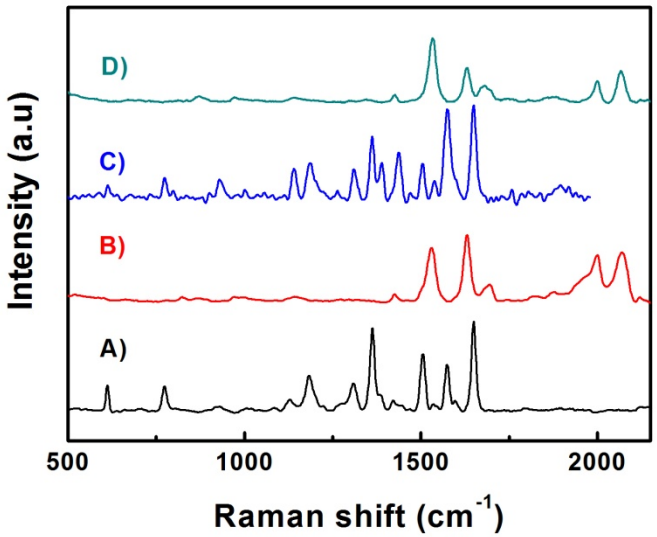

Fig. 5, ESI: SERS resorded in analyte mixtures. (A) R6G excited with 514 nm radiation; B) PATP excited with 633 nm radiation; (C) A mixture of R6G and PATP excited with 514 nm radiation; (D) A mixture of R6G and PATP excited with 633 nm radiation.

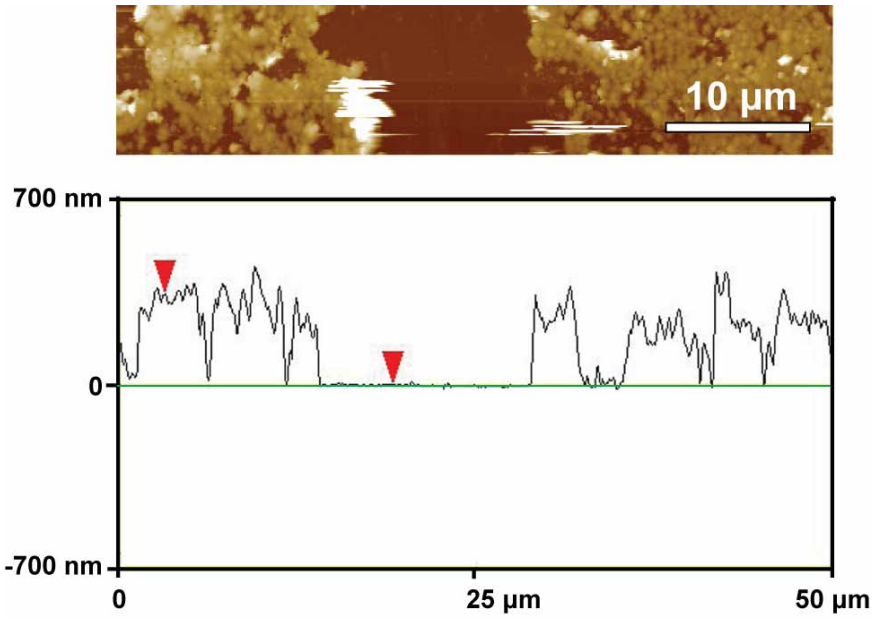

Fig. 6, ESI: AFM image and section analysis of a scratch made on gold film grown over carbon-caoted glass (sample used for conductivity and transparency measurements)

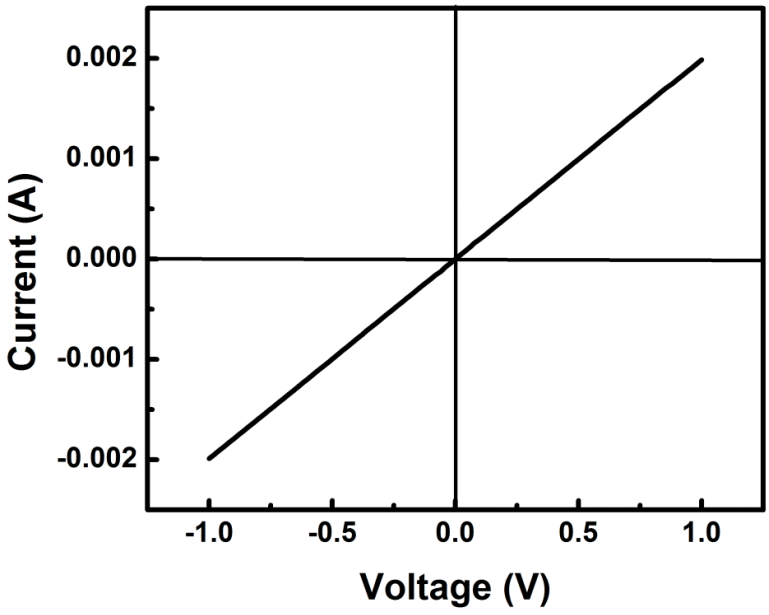

Fig. 7, ESI: Electrical conductivity of the Au nanofiber film in a *1 mm* electrode spacing. I-V curve obtained from a sample with 1 mm separation between the electrodes. The linear nature of the curve indicates Ohmic behavior.

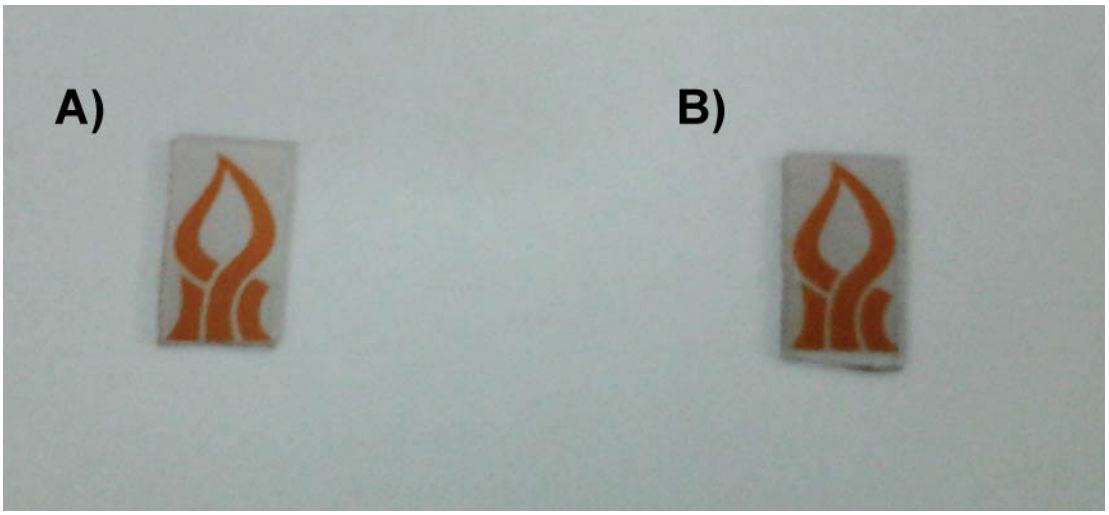

Fig. 8, ESI: Photographs showing the transparency of gold film (A) Carbon-coated glass film placed over a printed emblem; (B) Carbon-coated glass film coated with Au fibers and placed over a printed emblem.

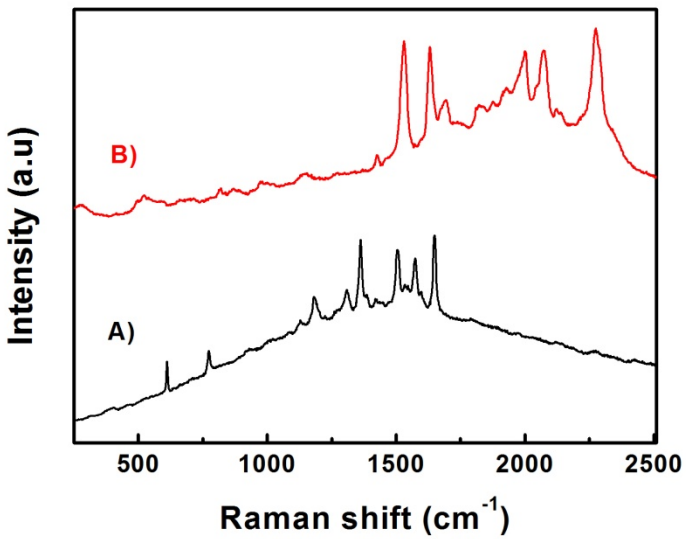

Fig. 9, ESI: SERS spectra without baseline correction (A) SERS spectrum of R6G (10^{-6}M) excited with a 514 nm radiation; (B) SERS spectrum of PATP (10^{-6}M) excited with a 633 nm radiation