# Supporting Information:

Fried egg-like Au mesostructures grown on poly(4-vinylpyridine) brushes grafted graphene oxide

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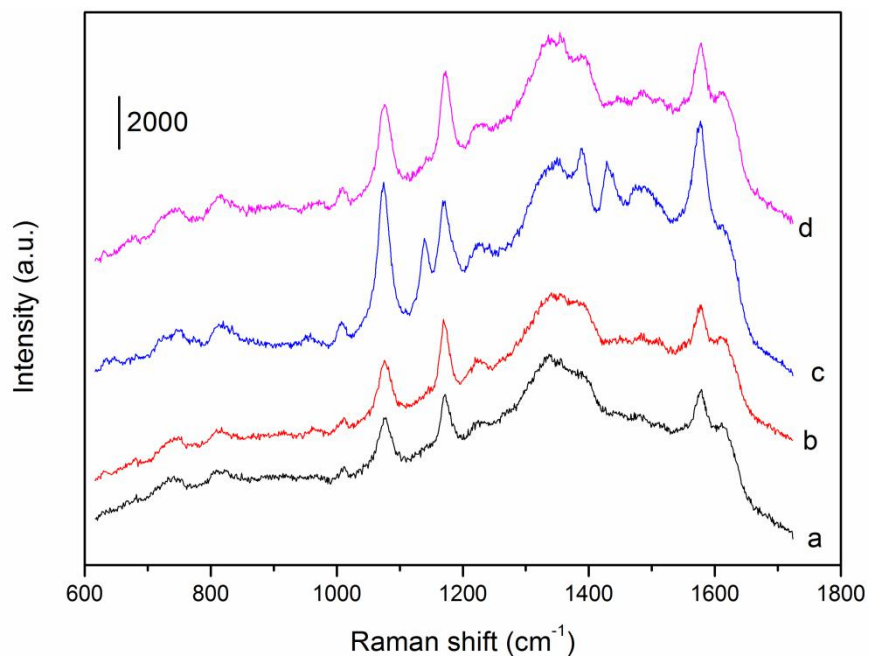
Figure S1. Raman spectra of 4-ATP (10^{-4}M) on the different Au nanostructures: (a) SEM image of the sample shown in Fig.2A; (b) SEM image of the sample shown in Fig.2B; (c) SEM image of the sample shown in Fig.2C; (d) SEM image of the sample shown in Fig.2D;

The calculation of EF value:

The value of the surface enhancement factor (EF) of 4-ATP on fried egg-like Au mesostructures is calculated according to the following expression: EF = $[I_{SERS}]/[I_{bulk}] \times [N_{bulk}]/[N_{ads}]$,[1] where I_{SERS} is the intensity of a vibrational mode in the SERS spectrum of 4-ATP and I_{bulk} is the intensity of the same mode in the Raman spectrum from the solid 4-ATP. For all spectra, the intensity of v_{cs} at 1079 cm^{-1} is used to calculate EF values. N_{bulk} is the numbers of molecules of the neat 4-ATP in the laser illuminination volume assuming a cylindrical focal volume (the diameter of the laser spot is 1 μm and the depth of the laser is 2 μm). Then, N_{bulk} is calculated by $N_{av}(\rho V_{laser}/M)$, in which N_{av} is the Avogadro number, V_{laser} is the focal volume of the laser illumination, M is the molecular weight of 4-ATP molecule (125.19 g mol^{-1}), and ρ is the density of 4-ATP molecule (1.18 g cm^{-3}). So, N_{bulk} is 8.91x10^9 molecules. If we assume the Au mesostructures as a compact flat surface, and 4-ATP is dispersed on Au mesostructures with dense monolayer coverage, then the density of 4-ATP is assumed to be 10^{-4} M×50μL×N_{av}/cm^{-2} (i.e., 3.01×10^{15}/cm^{-2}). Because the surface area of the laser spot (1 μm diameter) is about 7.85×10^{-9} cm^{-2}, the number of adsorbed molecules within the laser spot is 2.36 ×10^7. The ratio of N_{bulk} to N_{ads} is about 3.78×10^2. The ratio of I_{SERS} to I_{bulk} is about 100 according to **Figure S2**. Therefore, EF is calculated to be about 3.78×10^4.
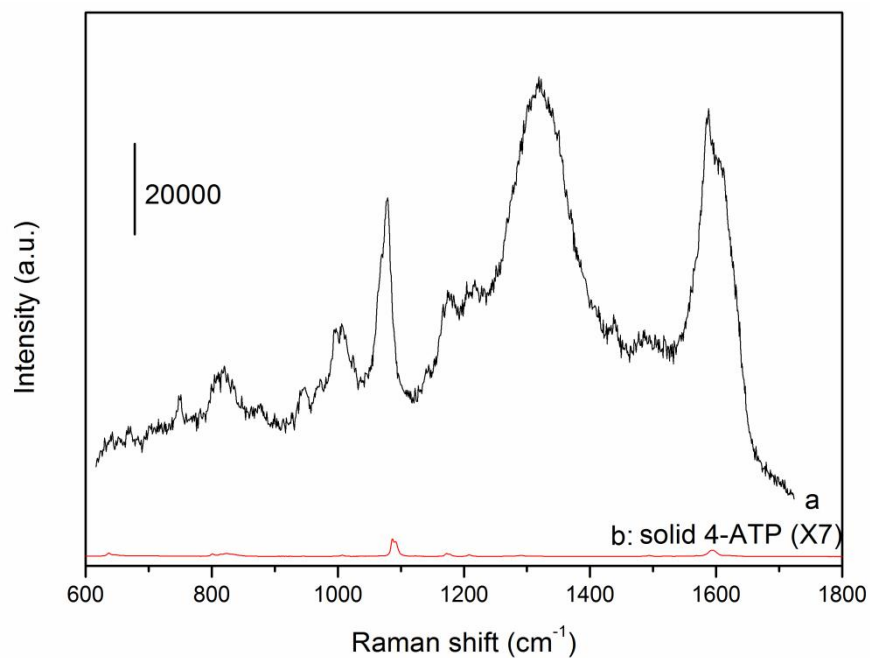
Figure S2. (a): Raman spectrum of 4-ATP (10^{-4} M) on fired egg-like Au mesostructures (SEM image of the sample shown in Fig.3D); (b): Raman spectrum of the solid 4-ATP.

Reference

1. S. J. Guo, L, Wang and E. K. Wang, *Chem. Commun.*, 2007, 3163-3165.