

## Supporting Information

# Gold Nanoparticle Superlattices: Novel Surface Enhanced Raman Scattering Active Substrates

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Figure S1. Photograph of the set-up used for the formation of Au@SGAN and Au@MSA SLs. Inset shows a magnified view of the plastic vessel used for the SL formation. The grown SL film is seen faintly.

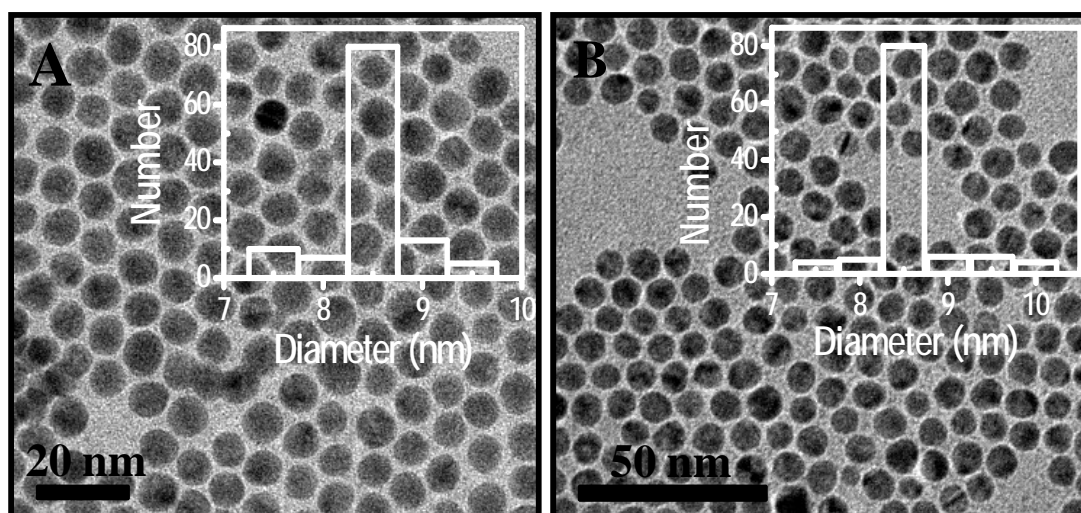


Figure S2. HRTEM images of isolated (A) Au@SGAN and (B) Au@MSA nanoparticles. Inset shows the corresponding histogram showing that the average particle size is 8.5 nm in each.

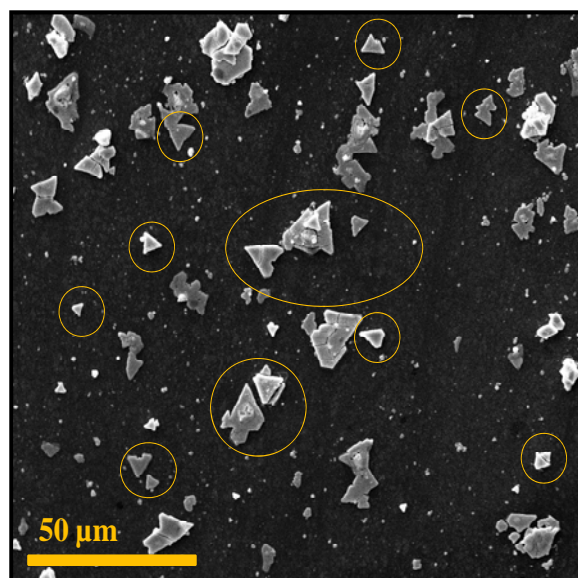


Figure S3. Large area SEM image of Au@MSA SL triangles. The triangular morphologies are marked by circles and ellipses.

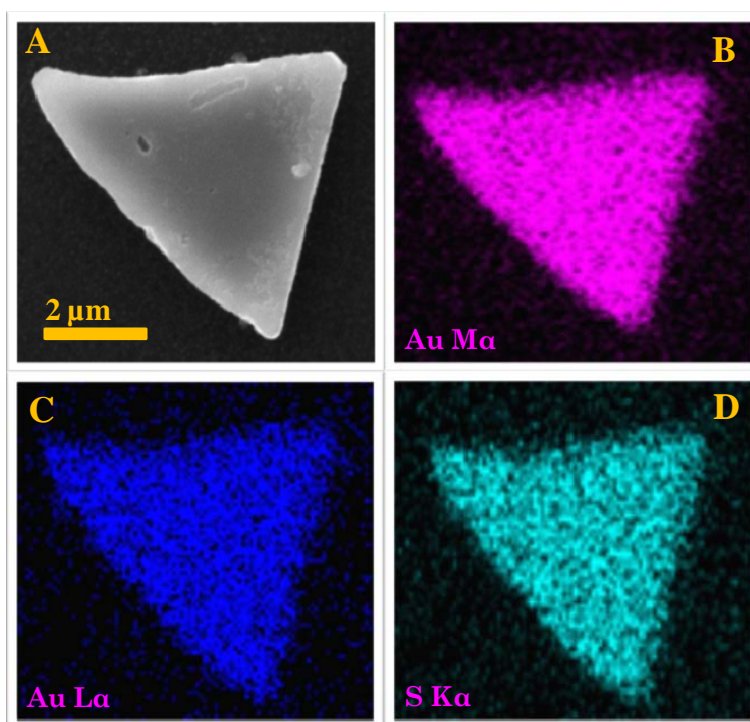


Figure S4. SEM image of an Au@MSA SL triangle (A). The EDAX maps of Au M $\alpha$ , Au L $\alpha$  and S K $\alpha$  of the triangle are given in B, C and D.

| Raman band assignment                     | Raman shift (cm <sup>-1</sup> ) |
|---|---------------------------------|
| ring C-C stretching                       | 1627                            |
| ring C-C stretching                       | 1592                            |
| ring C-C stretching                       | 1542                            |
| + ring deformation                        | 1484                            |
| ring C-C stretching                       | 1450                            |
| N-phenyl stretching                       | 1379                            |
| ring C-C stretching                       | 1305                            |
| ring C-H bend (II)                        | 1186                            |
| ring C-H bend (II)                        | 1131                            |
| ring skeletal vib. of radical orientation | 992                             |
| ring skeletal vib. of radical orientation | 922                             |
| ring C-H bend (⊥)                         | 819                             |
| ring C-H bend (⊥)                         | 768                             |
| ring C-H bend (⊥)                         | 738                             |
| ring skeletal vib. of radical orientation | 633                             |
| ring skeletal vib. of radical orientation | 572                             |
| ring skeletal vib. of radical orientation | 538                             |
| Ph-C+-Ph bend(⊥)                          | 432                             |
| Ph-C+-Ph bend( II)                        | 348                             |
| Breathing of central bonds                | 232                             |

(II) and (⊥) means in-plane and out-of-plane, respectively

Table 1. Assignment of Raman bands of the SERS spectrum of CV shown in Figures 4 and 6.

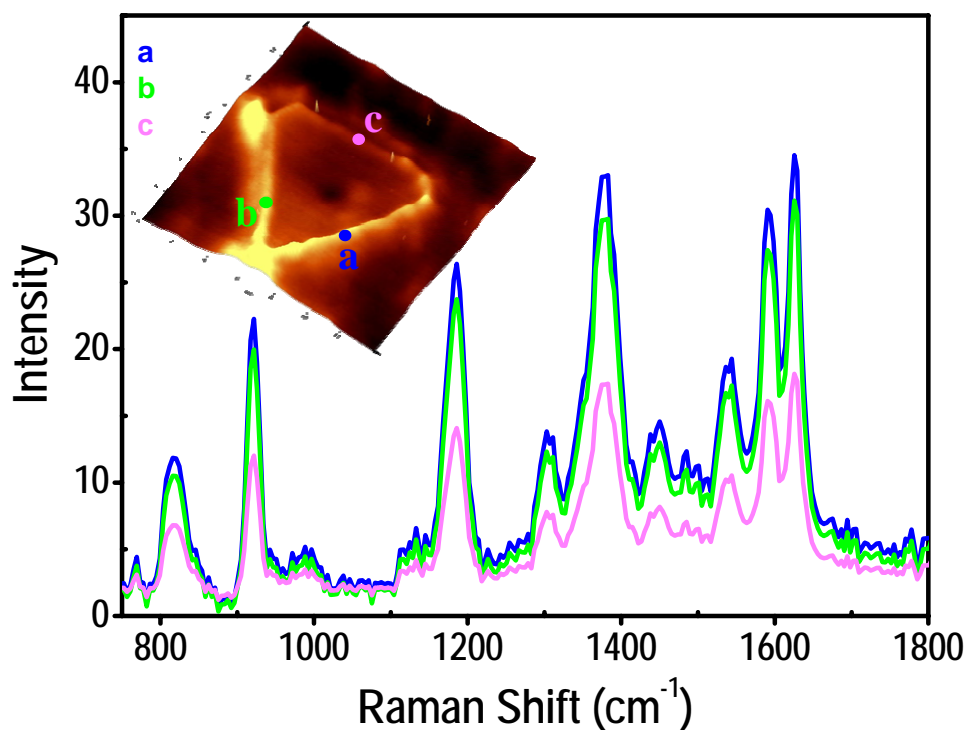


Figure S5. Raman spectra collected from three different edges of Au@MSA SL triangle shown in inset.

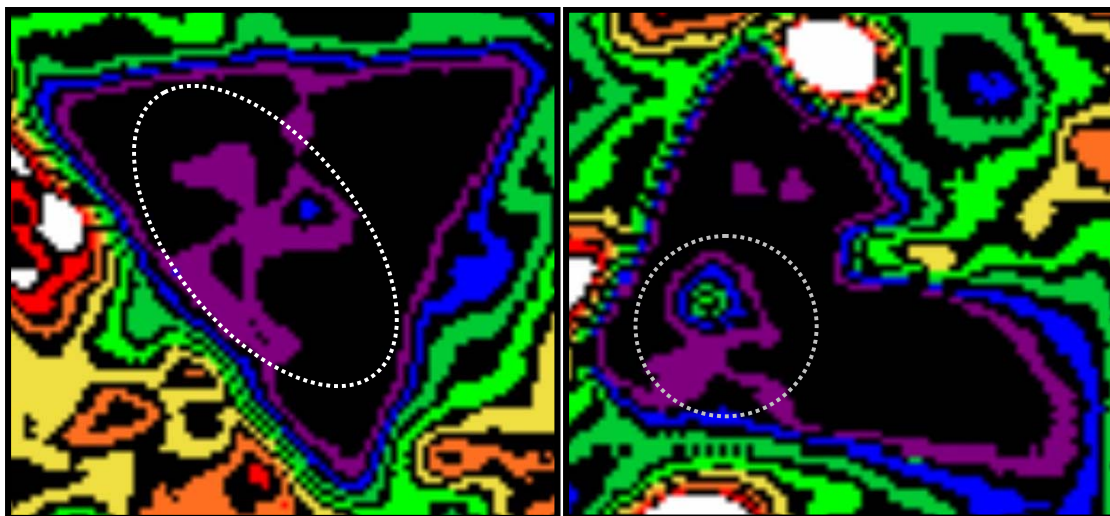


Figure S5. Color coded Raman images of Au@SGAN SL triangles. The defective area on the surface of the triangles shown in white circle shows more enhancement than a flat surface.