Electronic Supplementary Material (ESI) for Nanoscale

[Supporting Information]

High-Density Nanogaps on Solid Substrates Used for Surface Enhanced Raman Scattering for Detection of Molecules

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Supplementary Results

As shown in Fig. S1, the Raman intensity of PATP increased dramatically after second round of Ag deposition (2a), while no significant increase of Raman intensity can be observed after the substrate is coated with PATP SAMs (2b). Similarly, after third, fourth and fifth round of Ag deposition (3a, 4a and 5a), the Raman intensity increase obviously. However, it is hard to observe the Raman intensity variation after the coating of PATP on each round of Ag deposition (3b, 4c and 5c). This indicate that the obtained Raman enhancement of PATP mainly origins from the molecules located in the Ag nanogaps among the deposited Ag NPs generated in different steps of Ag deposition, due to the dramatic EF at these hot spots. The results for Au system are similar to that of Ag (Fig. S4).

Supplementary Figures

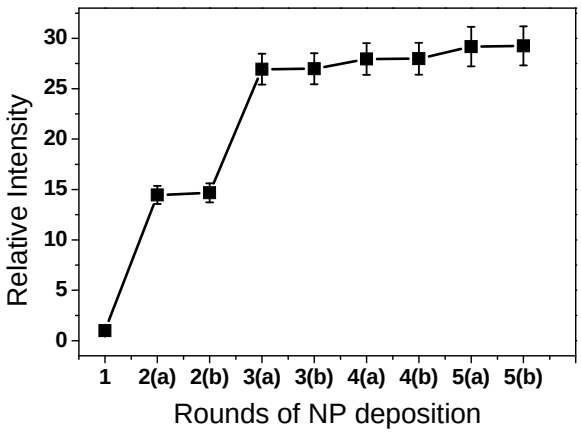

Fig. S1. Raman intensity variation of band at 1072 cm^{-1} after 1-5 rounds of Ag NP deposition. The 2(a), 3(a), 4(a) and 5(a) show the Raman intensity after 2^{nd}, 3^{rd}, 4^{th} and 5^{th} round of Ag NP deposition, respectively. The 2(b), 3(b), 4(b) and 5(b) show the Raman intensity after PATP SAMs coating on the samples of 2(a), 3(a), 4(a) and 5(a), respectively.

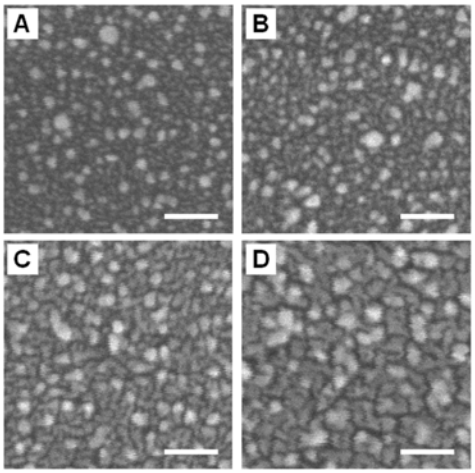

Fig. S2. SEM images of Au NPs deposited on Si at reaction time of (A) 15 s, (B) 30 s, (C) 60 s and (D) 120 s. Scale bars = 100 nm.

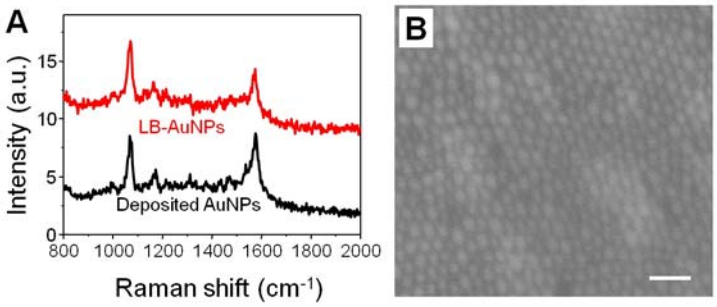

Fig. S3. (A) Raman spectra of PATP on the electroless deposited Au NPs at reaction time of 60 s and the monolayer of Au NPs (20 nm) fabricated by Langmuir-Blodgett (LB) method. (B) SEM image of the Au NP-monolayer fabricated by LB method. Scale bar = 50 nm.

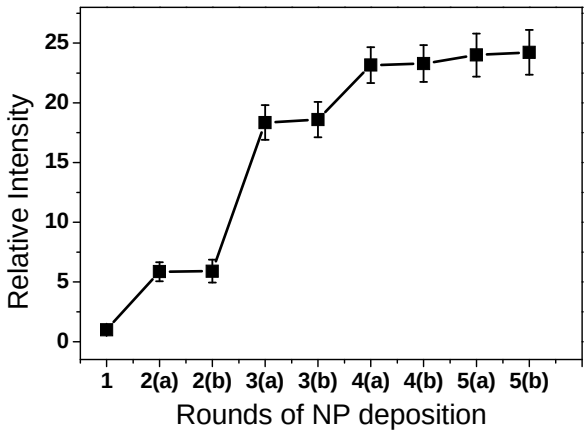

Fig. S4. Raman intensity variation of band at 1072 cm^{-1} after 1-5 rounds of Au NP deposition. The 2(a), 3(a), 4(a) and 5(a) show the Raman intensity after 2^{nd}, 3^{rd}, 4^{th} and 5^{th} round of Au NP deposition, respectively. The 2(b), 3(b), 4(b) and 5(b) show the Raman intensity after PATP SAMs coating on the samples of 2(a), 3(a), 4(a) and 5(a), respectively.