

## Facile Preparation and Application of Large-area and Uniform Arrays of Metallic Nanoparticles on Various Solid Substrates

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Nanogaps between metallic nanostructures have been widely exploited for Surface-enhanced Raman Spectroscopy (SERS) due to their high electromagnetic field enhancement and plasmonic coupling. Regularly ordered arrays of metallic nanogap structures for high SERS activity were fabricated with the aid of state-of-the-art micro/nanofabrication. However, there remains a need for reliable and facile fabrication method of such array. Here we present a facile method to providing large-area, highly close-packed arrays of gold nanoparticle on a wide variety of solid substrates. First, gold-silica core-shell nanoparticle with uniform shell thickness (5 nm) is prepared. These particles are then forced to be self-assembled on an air/water interface, followed by the direct transfer onto solid substrates such as glass, ITO glass and PDMS. Close-packed 2-dimensional array of the core-shell nanoparticles on the various solid substrates are extensively characterized by TEM, SEM, and UV-vis spectrophotometer. For SERS measurement, the silica shells between the gold cores are removed by chemical etching.