Laser rapid thermal annealing enables tunable plasmonics in nanoporous gold nanoparticles

Supplementary Information

Chemicals and materials. The alloy sputtering target $Ag_{0.7}Au_{0.3}$ (atomic percentage) is provided by ACI Alloys, INC. 99.999% argon gas was used for RF sputter- etching. The micro cover glass (22×40 mm, No.1) is purchased from VWR. Ethanol (200 proof) is from Decon Laboratories, Inc. Nitric acid (ACS reagent, 70%), Chloroform (anhydrous, ≥99.0%), Latex beads (polystyrene beads, 10% aqueous suspension) with mean particle sizes 0.46 μm, and Benzenethiol (BT, ~95%) were purchased from Sigma Aldrich.

Absolute Extinction Spectra of NPG nanoparticles before and after laser RTA. Figure S1 represents the absolute extinction spectra for NPG nanoparticles before and after laser RTA.

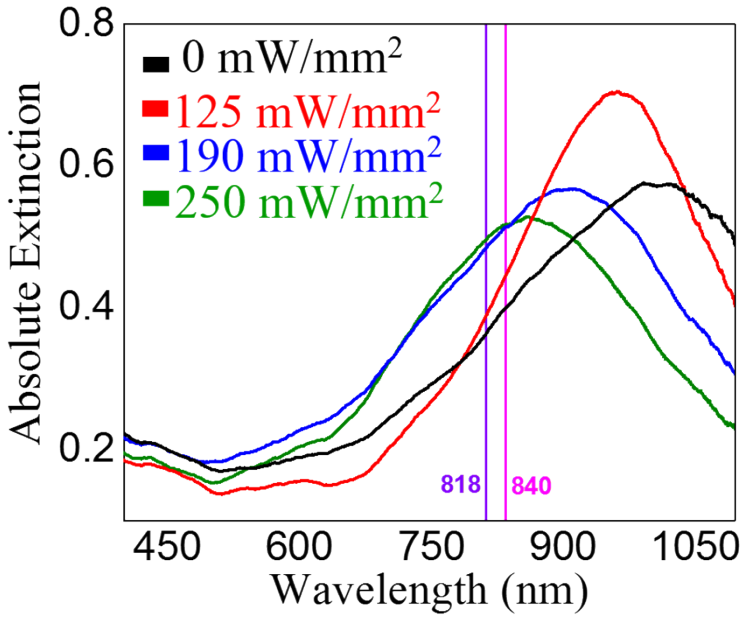

Fig. S1: Absolute extinction spectra for NPG nanoparticles before and after laser RTA

Considering absolute extinction spectra, it is found that at 840 nm wavelength (LSPR wavelength for 1575 cm^{-1} Raman band optimization), extinction value increases with increasing laser intensity. Thus if we assume extinction measurement can represent electric field enhancement, we can say that the electric field enhancement also increases with increasing laser power density. The Raman scattering enhancement after laser RTA can also be attributed to this fact. In Fig. S1, 818 nm solid line corresponds to the LSPR wavelength for optimizing 997 cm^{-1} band (first peak shown in Fig. 5) in BT SERS spectrum.