Lay Gold Nanorods Monolayer down on Solid Surfaces for

Surface Enhanced Raman Spectroscopy Applications

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	longitudinal length (nm)	transverse length (nm)	aspect ratio	transverse LSPR wavelength (nm)	longitudinal LSPR wavelength (nm)
s-GNRs	35.9	16.0	2.2	515	691
m-GNRs	41.9	15.2	2.8	515	743
l-GNRs	43.8	14.2	3.1	515	797

Table S1. The parameters of as-obtained GNRs with different aspect ratio.



Figure S1. UV-Vis-NIR extinction spectra of aqueous solutions of s-GNRs (a, b) and l-GNRs (c, d) with various concentrations of EDTA. (a, c) and (b, d) were measured 5 min and 24 h after the addition of EDTA.



Figure S2. SEM images of monolayer film of laying-down l-GNRs on solid substrate with large area (a: $21 \times 14 \mu m$, b: $1.9 \times 1.6 \mu m$) and high coverage prepared by the hybrid method.



Figure S3. Magnified SEM image of l-GNRs (a) and histogram of inter-nanorod spacing between sides of GNRs (b) prepared by hybrid method.



Figure S4. Schematic drawing of the formation of GNRs assemblies by three different methods: hybrid method (a), electrophoresis without solvent evaporation (b) and solvent evaporation without electrophoresis (c).



Figure S5. Magnified SEM image of l-GNRs (a) and histogram of inter-nanorod spacing between sides of GNRs (b) prepared by electrophoresis without solvent evaporation.



Figure S6. Magnified SEM image of l-GNRs (a) and histogram of inter-nanorod spacing between sides of GNRs (b) prepared by solvent evaporation without electrophoresis.



Figure S7. The integrated histogram of inter-nanorod spacing between sides of 1-GNRs observed in the samples prepared by hybrid method (Figure S3), electrophoresis without solvent evaporation method (Figure S5), and solvent evaporation without electrophoresis method (Figure S6).



Figure S8. UV–Vis–NIR extinction spectra of s-, m-, and l-GNRs self-assembled on gold coated quarts glass substrate before thermal annealing treatment.