Electronic Supplementary Material

Mesoflowers: A New Class of Highly Efficient Surface-Enhanced Raman Active and Infrared-Absorbing Materials

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(a)　　　　　　(b)

(c)　　　　　　(d)

Figure S-1 (a) SEM image of a single mesoflower. Corresponding EDAX images using (b) Au Lα, (c) N Kα, and (d) Si Kα. While no N is present, shadowing due to the mesoflower gave a negative image in the case of Si

Figure S-2 Top view of a single stem at different rotation angles. The nanoparticle at the apex can be clearly seen
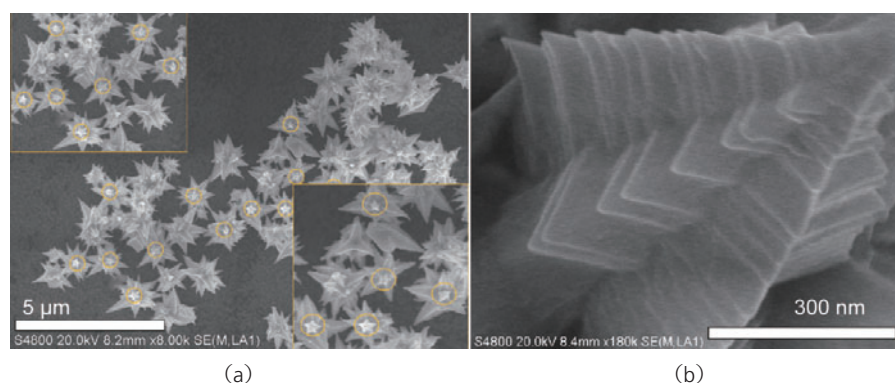
(a)   (b)

Figure S-3 (a) Large area FESEM image of the gold mesoflowers; (b) enlarged view of a stem
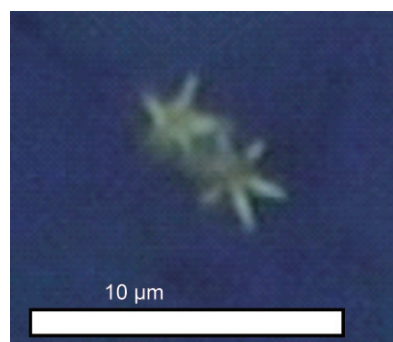

Figure S-4 An optical image of larger gold mesoflowers taken under white light illumination. The five-fold symmetry of the stem is not visible in an optical image due to diffraction limits
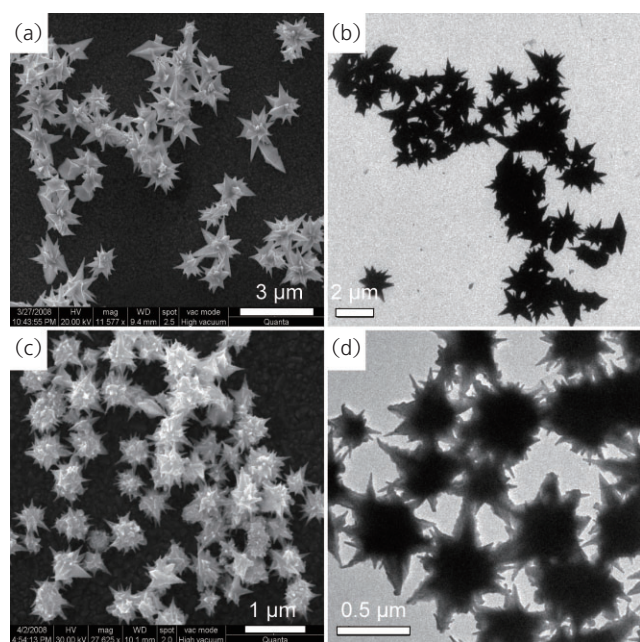

Figure S-5 Large area (a) SEM and (b) TEM images of the mesoflowers of size 1–2 μm. Lage area (c) SEM and (d) TEM images of mesoflowers of size 0.5–1 μm. As TEM is a two-dimensional projection, the features observed in SEM are not all seen
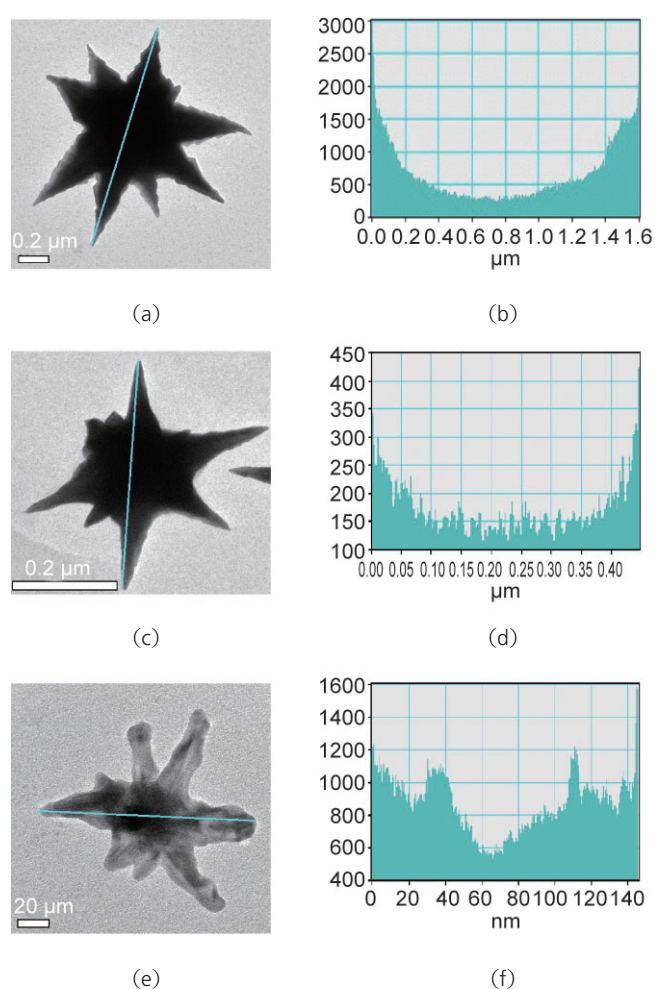

(a)   (b)

(c)   (d)

(e)   (f)

Figure S-6 TEM images of mesoflowers of different sizes synthesised by adding varying amounts of seed nanoparticles into the growth solution and their corresponding line profile analyses. The volumes of seed solution added were (a) 2 mL, (c) 5 mL, and (e) 6 mL
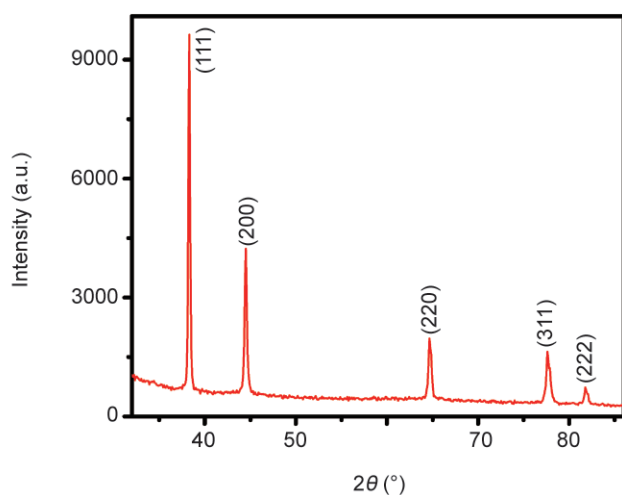
Figure S-7 XRD pattern of gold mesoflowers. The reflections are marked
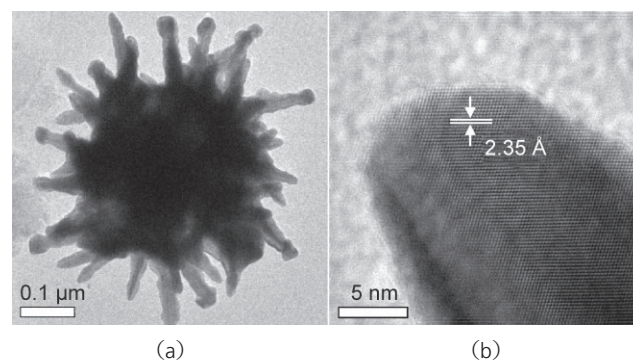

Figure S-8 (a) TEM image of a single meatball-like gold mesoparticle and the corresponding lattice-resolved image taken from its tip (b)
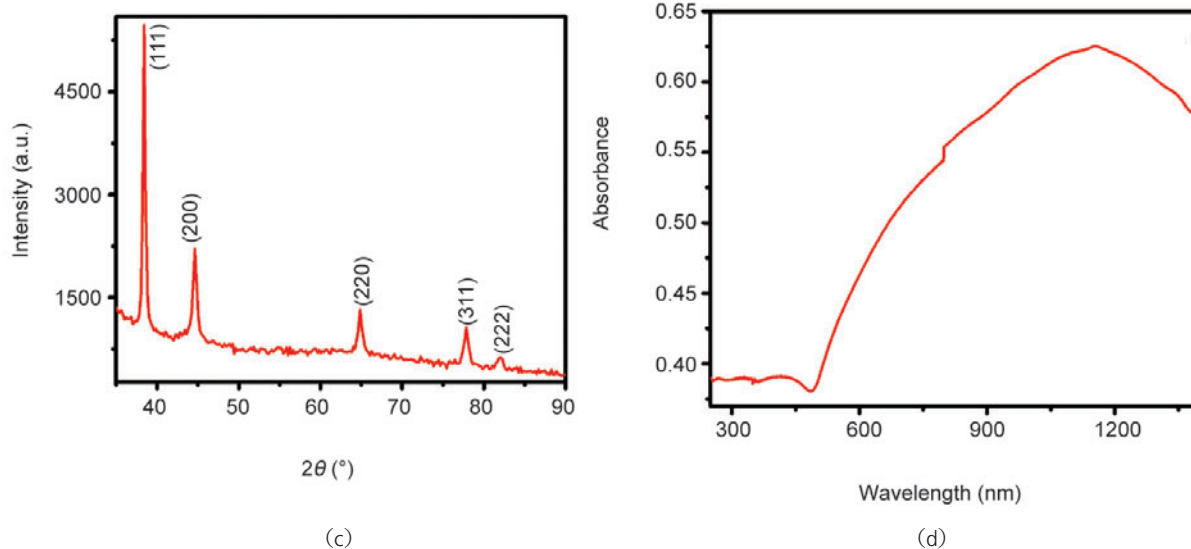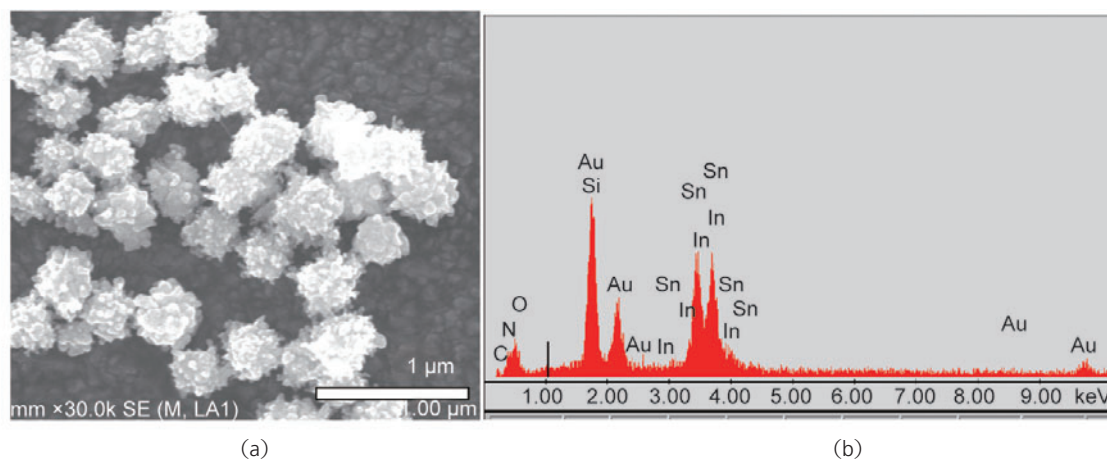

Figure S-9 Large area SEM image (a) and the corresponding EDAX spectrum (b) of the meatball-like gold mesoparticles; (c) and (d) are the XRD pattern and UV–vis–NIR absorption spectrum (in water) of meatball-like gold mesoparticles, respectively. Signals due to elements In, Sn, and Si arise from the ITO conducting glass substrate used and, therefore, it is clear that the material is principally gold
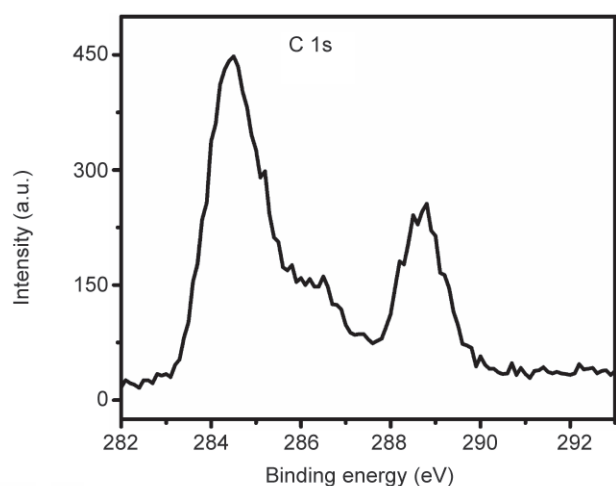
Figure S-10 The enlarged XPS spectrum of Au/oligoaniline seeds in the C 1s region
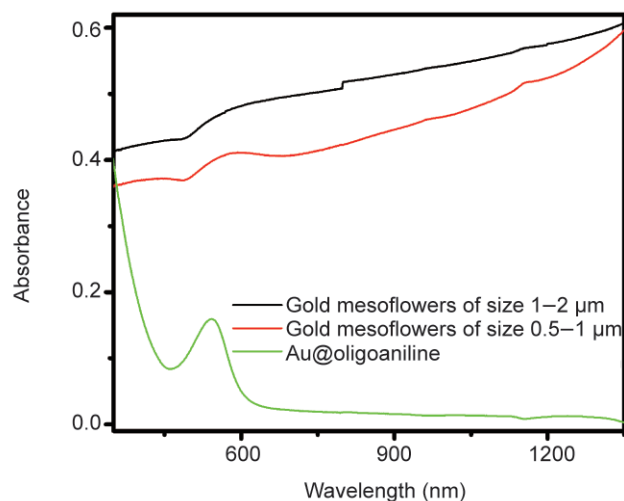

Figure S-11 UV–vis–NIR absorption spectra of water dispersions of gold mesoflowers of different sizes. The green trace shows the spectrum of the precursor Au/oligoaniline nanoparticles
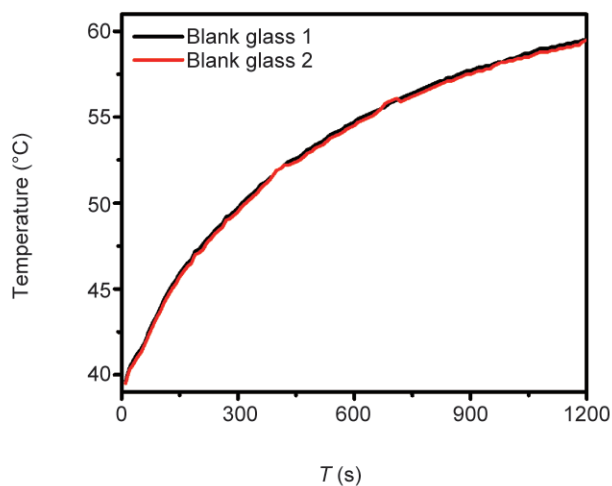

Figure S-12 A plot of variation of temperature inside two cardboard boxes covered with blank glass plates as a function of exposure time to sunlight
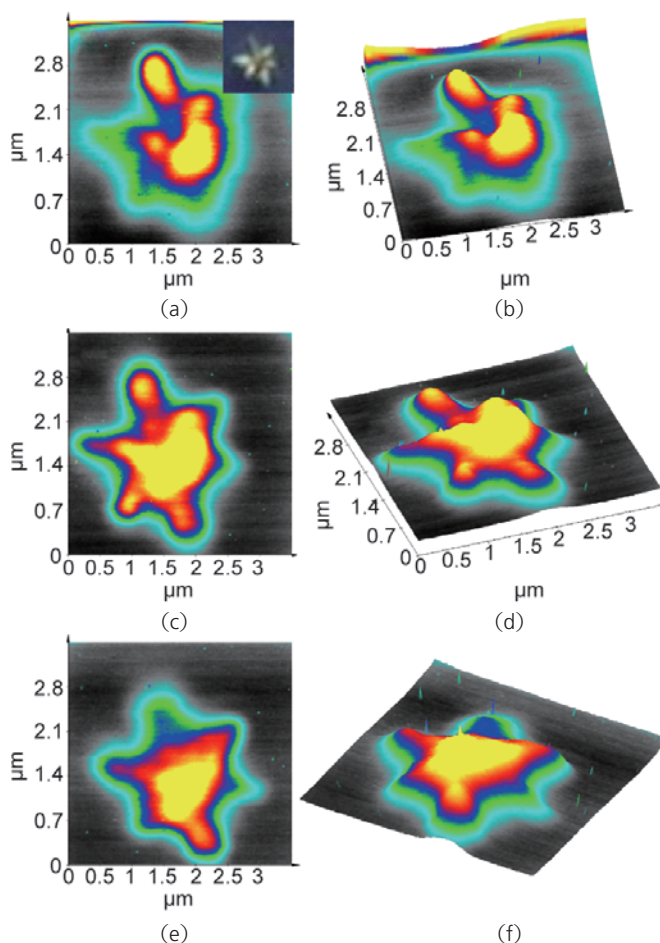

(a)

(b)

(c)

(d)

(e)

(f)

Figure S-13 Color coded confocal Raman images and corresponding 3-D views of a mesoflower at different depths. (a), (c), and (e) are images at depth 0, 1 and 2 μm, respectively. (b), (d), and (f) are the 3-D views of (a), (c), and (e), respectively. The inset in (a) is the optical image of the mesoflower selected for Raman imaging. The images reflect the 3-D nature of the mesoflower