

Supporting Information for

Controllable synthesis of tetrapod gold nanocrystals with precisely tunable near-infrared plasmon resonance towards high efficient surface enhanced Raman spectroscopy bioimaging

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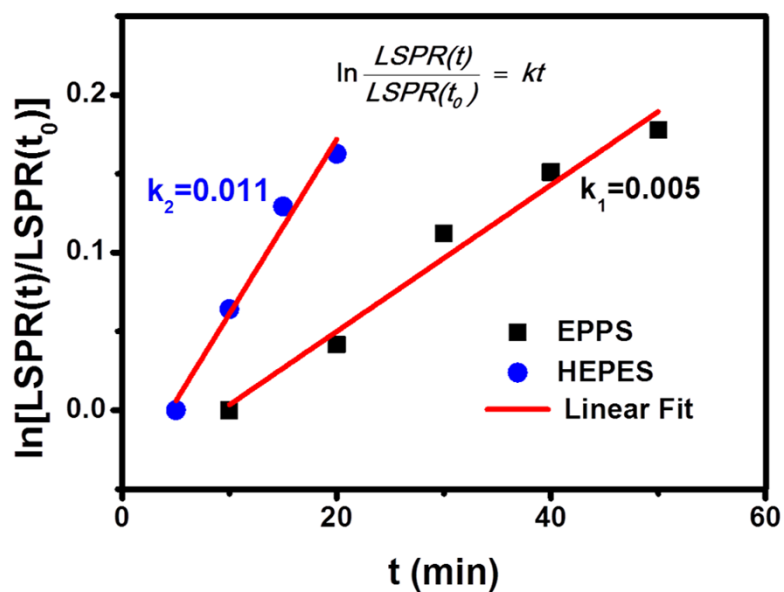


Fig. S1. The kinetics plots of tetrapod Au nanocrystals growth with different reducing agents, EPPS and HEPES. The two growth kinetics models both follow pseudo-first order reaction as shown in equation: $\ln[x(t)/x(t_0)]=kt$, where k is the apparent rate constant (min^{-1}), $x(t)$ and $x(t_0)$ are LSPR peak value at time (t) and (t_0). t_0 is 10 min for EPPS and 5 min for HEPES.

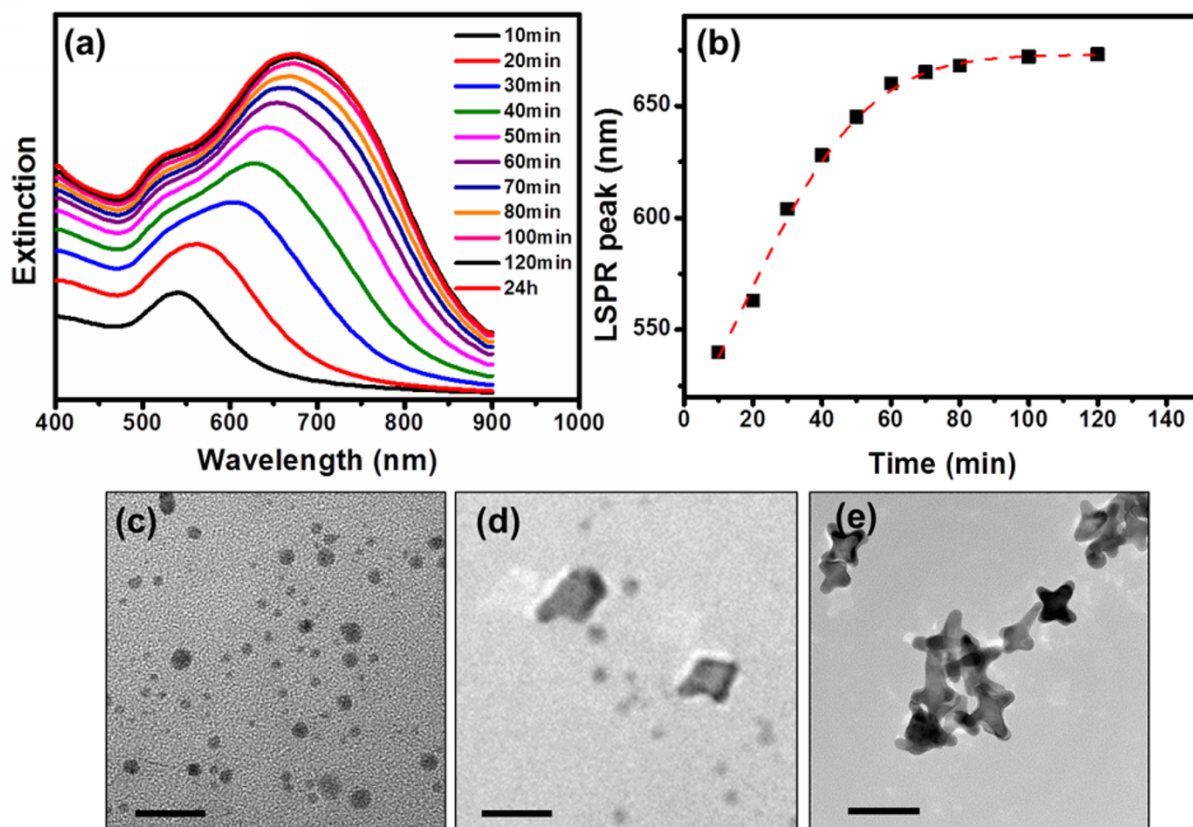


Fig. S2. (a) Extinction spectra of tetrapod Au nanocrystals in reaction solution recorded as a function of time. (b) The LSPR peaks of the Au nanocrystals as a function of time. Representative TEM images of products formed after (c) 10, (d) 30 and (e) 60 min of reaction. The scale bars are 20 nm, 20 nm and 50 nm.

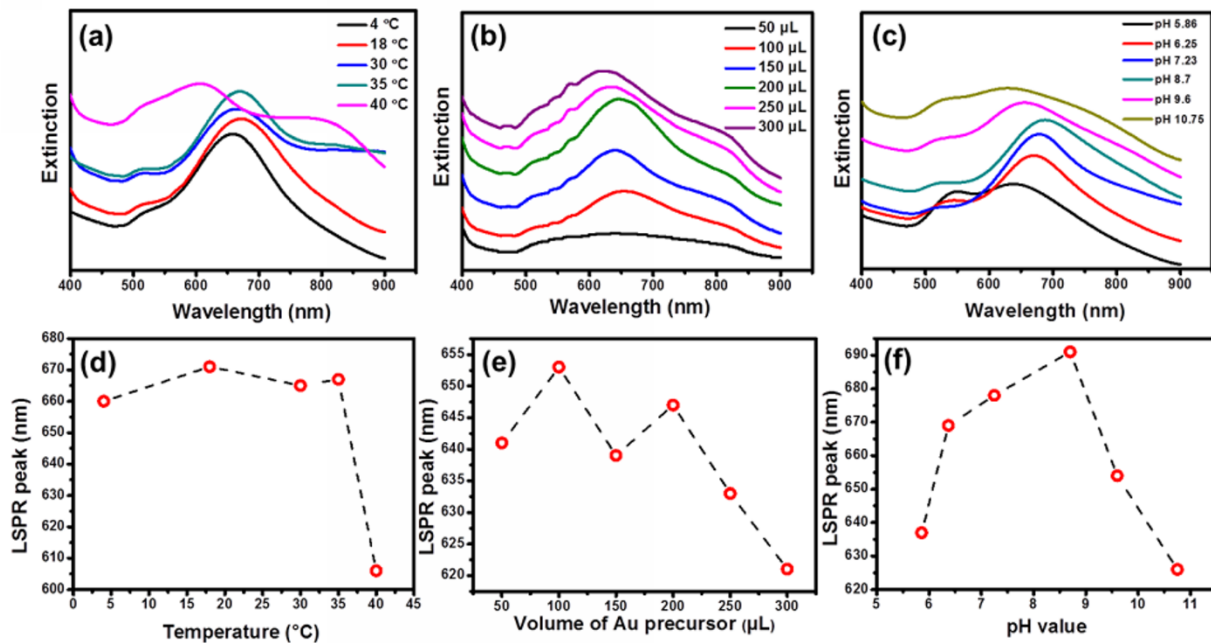


Fig. S3. Extinction spectra of tetrapod Au nanocrystals synthesized with varied temperature (a), Au precursor volume (b) and pH value (c). The LSPR peaks of the tetrapod Au nanocrystals as a function of temperature (d), Au precursor volume (e) and pH value (f).

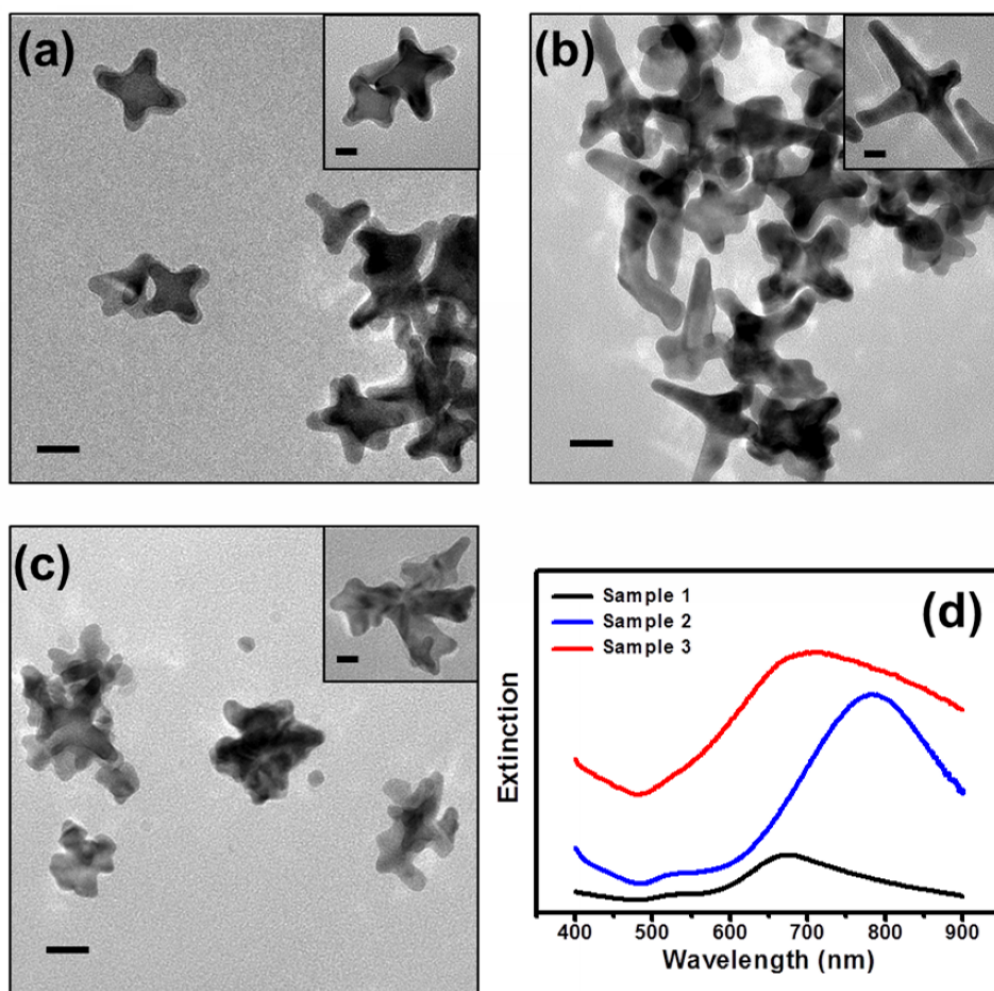


Fig. S4. TEM images of (a) tetrapod Au₆₇₀ nanocrystals seeds (Sample 1), (b) tetrapod Au nanocrystals synthesized by gradually adding Au precursors up to 300 μ L (Sample 2) and (c) Au nanoparticles synthesized by immediately adding 300 μ L Au precursors (Sample 3). The scale bars are 20 nm in (a-c) and 10 nm in inset of (a-c). (d) Extinction spectra of Sample 1-3.

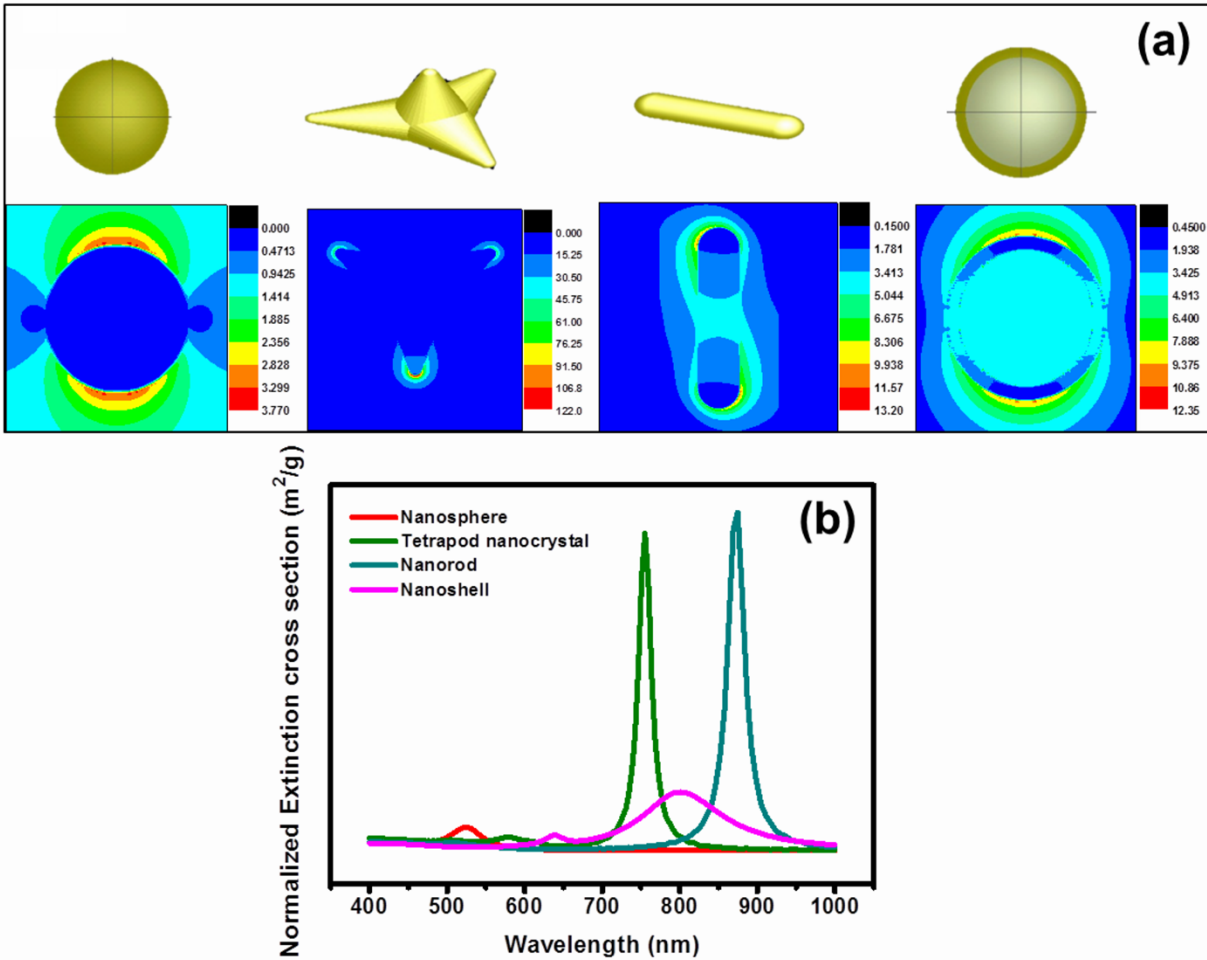


Fig. S5. (a) FDTD simulated electromagnetic field distributions of different gold nanostructures, including nanosphere (25.8 nm diameter), tetrapod nanocrystal (7 nm core, 28 nm branches), nanorod (14 nm width, 4.5 aspect ratio), nanoshell (130 nm diameter, 110 nm silica core), from left to right. (b) Normalized simulated extinction spectra of different gold nanostructures.

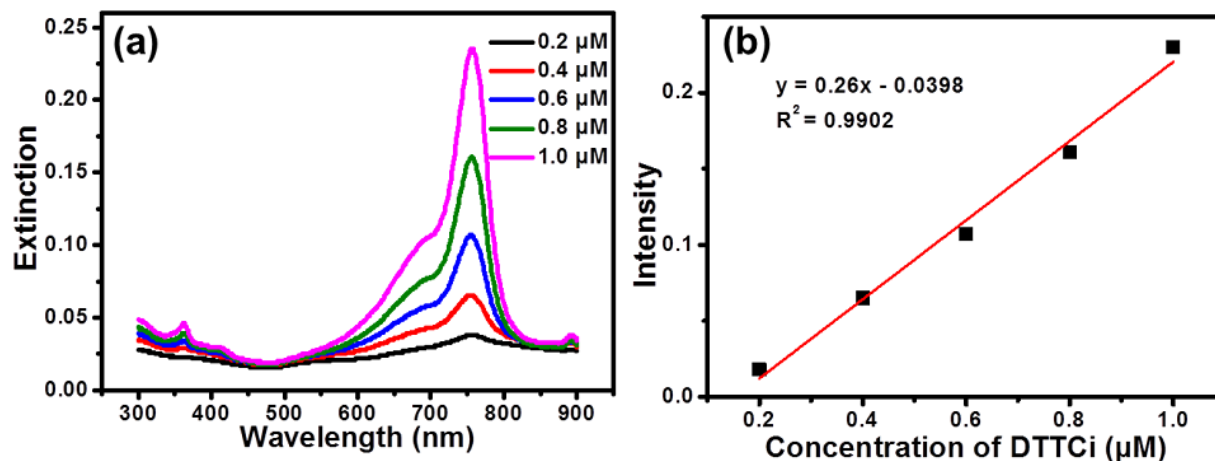


Fig. S6. (a) Extinction spectra of DTTCi with different concentration in DMSO. (b) The Beer's law plot for DTTCi (characteristic peak at 756 nm).