Supporting Information

Fluorescence enhancement from single gold nanostars: towards ultra-bright emission in the first and second near-infrared biological windows

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Table S1. Morphological characteristics of S-AuNSs and L-AuNSs obtained through seed-mediated synthesis.

	Number of spikes	Size (nm)	Core Size (nm)	Spike length (nm)	Spike width (nm)	Spike Aspect Ratio
S-AuNS	8-16	47 ± 17	27 ± 7	10 ± 6	7 ± 3	1.4
L-AuNS	14-26	214 ± 90	132 ± 34	60 ± 52	13 ± 12	4.6

3D FDTD modelling:

In our FDTD modelling for gold nanostars, a Drude-Lorentz model was used to define the permittivity of gold [1]:

$$\varepsilon(\omega) = 1 - \frac{f_1\omega_p^2}{\omega(\omega - i\Gamma_1)} + \sum_{j=2}^{n}\frac{f_j\omega_p^2}{(\omega_{o,j}^2 - \omega^2) + i\omega\Gamma_j}$$

Where ω_p is the plasma frequency, f_j is each oscillator's strength, Γ_j is the reciprocal of each oscillator's lifetime and ω_o is the resonant frequency of each oscillator. In our case, adopted values are listed below.

Table S2. Parameters used to define the permittivity of gold

Au (ω_p = 9.03 eV)						
j	1	2	3	4	5	6
f	0.760	0.024	0.010	0.071	0.601	4.384
$\Gamma\ (eV)$	0.053	0.241	0.345	0.870	2.494	2.214
$\omega_o\ (eV)$	0.000	0.415	0.830	2.969	4.304	13.32

[1] Aleksandar D. Rakić, Aleksandra B. Djurišić, Jovan M. Elazar, and Marian L. Majewski, "Optical properties of metallic films for vertical-cavity optoelectronic devices," Appl. Opt. 37, 5271-5283 (1998)