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Supplementary Information

Gold Nanodisc Arrays as Near Infrared Metal-Enhanced Fluorescence Platforms with Tuneable Enhancement Factors

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Parameters used in FDTD calculations for Gold

In the FDTD model the gold was modelled using a Drude-Lorentz model with one Drude and five Lorentz terms in the summation:

$$\varepsilon(\omega) = \varepsilon_\infty + \sum_{i=1}^{n} \frac{\alpha_i \omega_p^2}{\omega_{oi}^2 - \omega^2 - j\omega\tau_i} \qquad (1)$$

where ω_p is the plasma frequency, α is the strength of the oscillators, ω_o is the resonant frequency of each oscillator, *j* is the imaginary unit and τ is the damping frequency of each oscillator. Table 1 gives the values that were used.

Table S1. Parameters used in the Drude-Lorentz Model

Gold ω_p=9.03 eV						
i	1	2	3	4	5	6
α	0.760	0.024	0.010	0.071	0.601	4.384
τ (eV)	0.053	0.241	0.345	0.870	2.494	2.214
ω_o(eV)	0.000	0.415	0.830	2.969	4.304	13.32

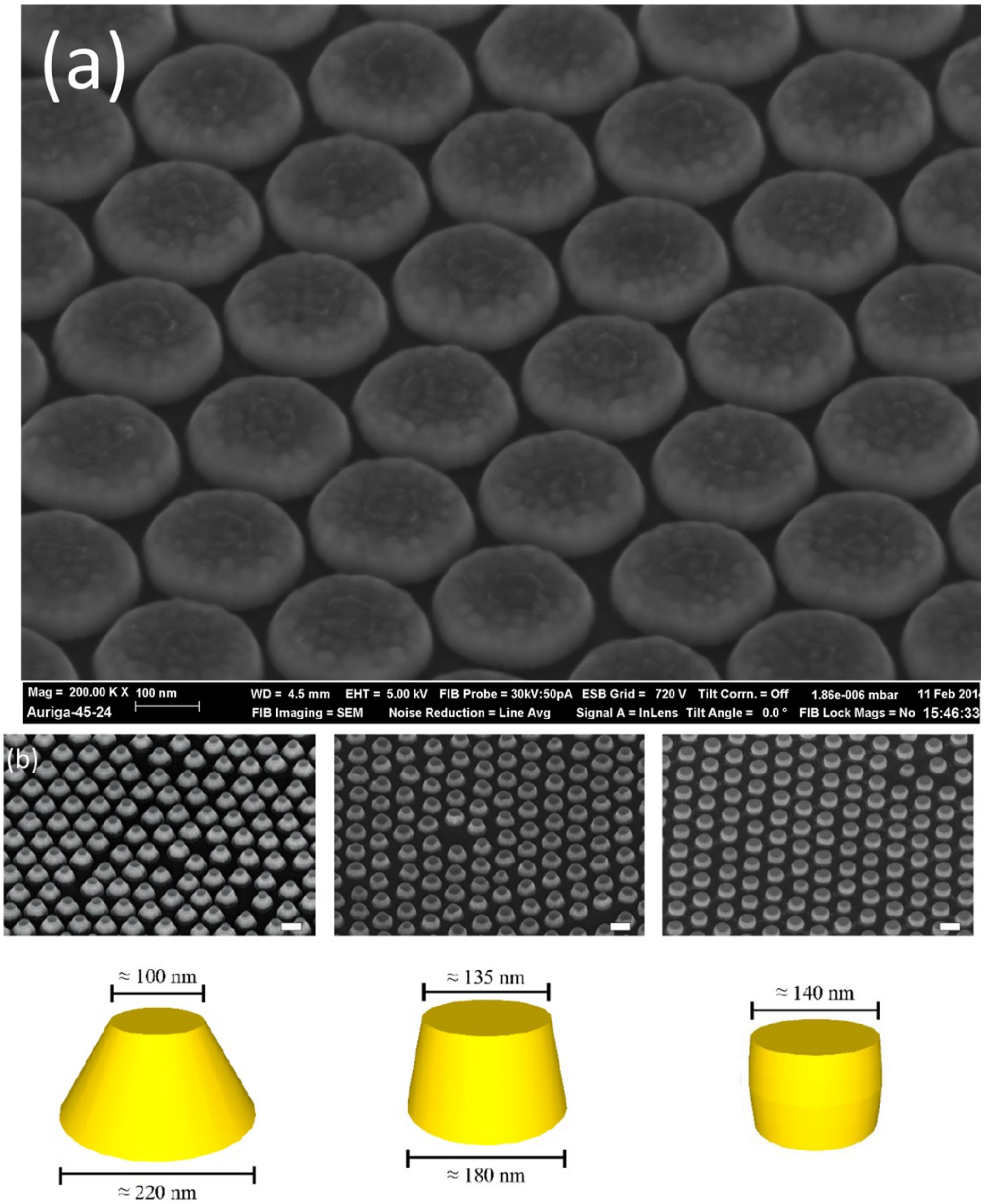

Figure S1. (a) 45°-tilted view scanning electron microscopy (SEM) image of Au nanodiscs fabricated through nanosphere lithography onto 50 nm-thick Au films, using 290 nm polystyrene (PS) spheres. Measurement of the base diameter and top diameter of the nanodiscs, allowed calculation of the angle of the sidewalls at around 80°. (b) Example of the effect of Ar ion beam direction on the morphology of Au nanodiscs. SEM images of Au nanodiscs and illustration of their geometric shape, obtained with the sample stage constantly rotating, and tilted at θ = 0° (*i.e.* stage perpendicular to the neutralized ion beam; left), θ =23° (centre) or θ =45° (right). Scale bars 200 nm.

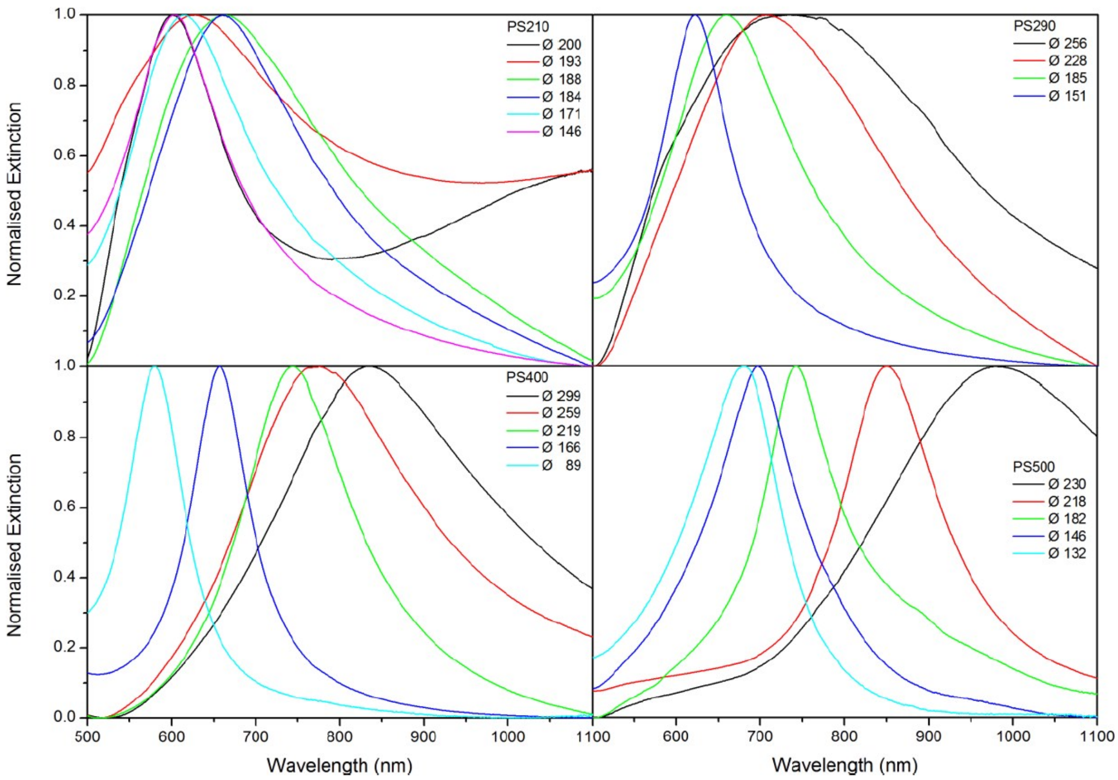

Figure S2. Normalised extinction spectra of 50 nm thick Au nanodisc arrays with different diameters (Ø), fabricated by nanosphere lithography using 210 nm (PS210), 290 nm (PS290), 400 nm (PS400) or 500 nm (PS500) polystyrene (PS) spheres. The PS sphere size determines the centre-to-centre distance (pitch) between the nanodiscs.