

Supporting Information

Plasmon-controlled Excitonic Emission from Vertically-Tapered Organic Nanowires

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Absorption spectrum:

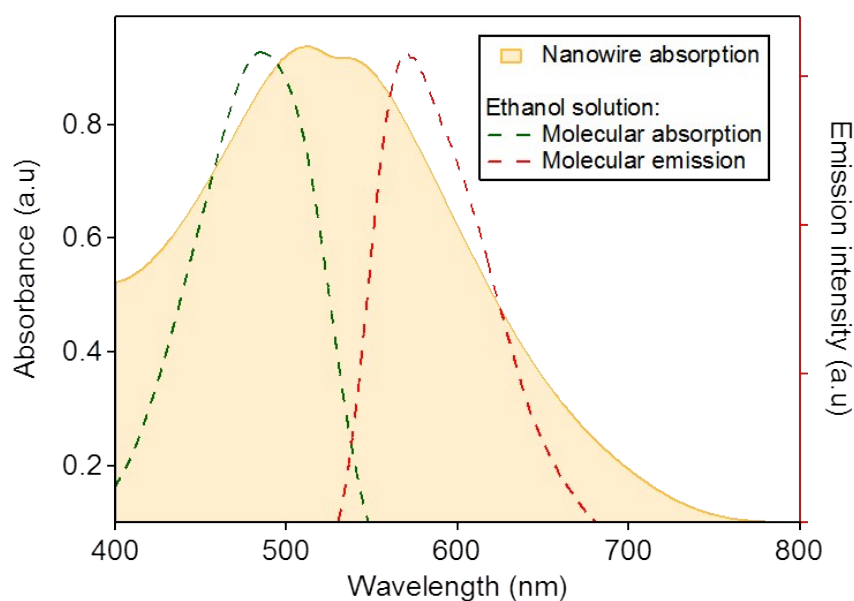


Figure S11. Absorption spectra of DAAQ nanowires (shaded region) compared with absorption and emission of DAAQ molecules in ethanol. Green and red dotted curves are the absorption and emission spectra from the DAAQ molecules dissolved in ethanol solution.

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Emission spectra from multiple nanowires:

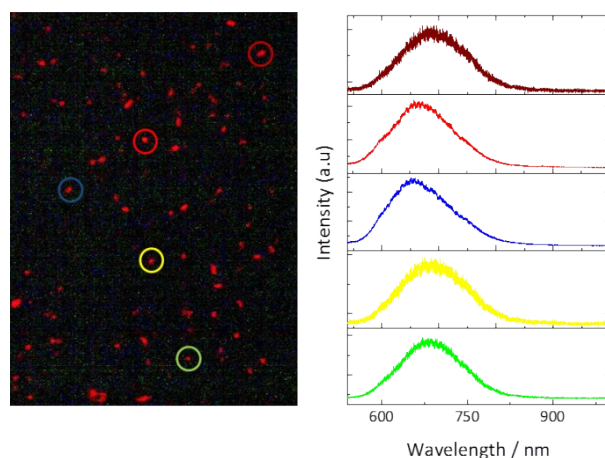


Figure SI2. Emission spectra from various nanowires. (left) Photoluminescence image of well separated vertical nanowires, captured by blocking the incident laser. Each bright red spot is the emission light from a single nanowire. (right) Corresponding emission spectrum from each nanowire; particular colour of each spectrum is correlated to a PL image of nanowire represented by solid circle in (left).

FDTD Simulations:

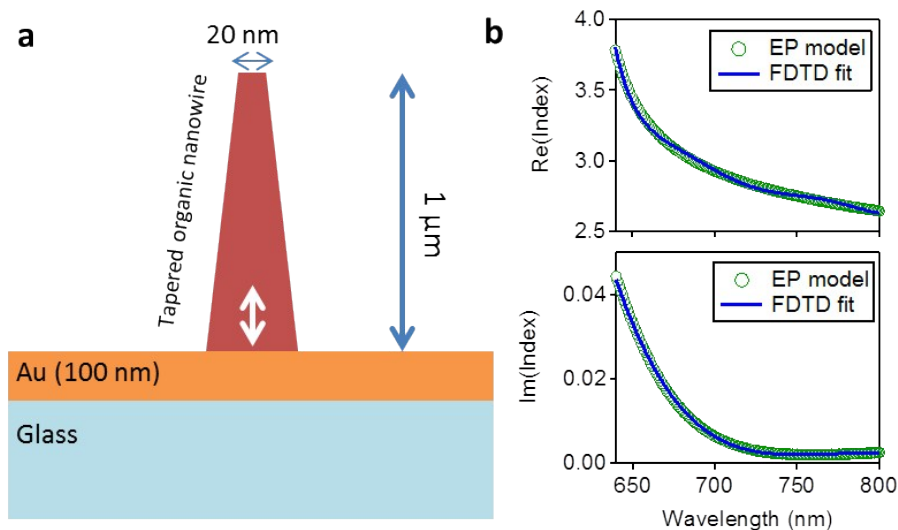


Figure SI3. FDTD simulation setup. (a) Schematics of simulated geometry. Organic nanowire is modelled as a material with refractive index (RI) parameters obtained from exciton-polariton (EP) model¹⁻³. (b) FDTD fit for real and imaginary parts of RI parameters obtained from EP model.

Section I: FDTD simulation method

Experimentally obtained EP model fit parameter³ (n,k) values are used as inputs for FDTD simulations. Fig. SI3a shows the schematic used for simulations; it consists of a tapered cylindrical nanowire with base and tip diameter of 200 and 20 nm respectively placed on a 100 nm gold film. Glass and metal film are extended in x-y dimensions to the PML boundaries placed 6 microns from the centre. A vertical dipole placed at the centre of organic nanowire⁴ with 10nm above the metal film is used as excitation source. A frequency domain field monitor is used to capture the nearfields (shown in the Fig. 3b of main manuscript), further similar 2D monitor is placed 200 nm above the tip of nanowire was used to measure the transmission energy at 700 nm. Set of simulations are performed by using inbuilt sweep function.

References:

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