Synthesis and Optical Characterization of Sub-micron Gold Nanotubes
Grown on Goethite Rods

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SUPPORTING INFORMATION
Figure S1 describes a) the statistical plot of tube length formed during the synthesis, b) a TEM image of the goethite particles, c) a TEM image of the goethite particles absorbed with Au seeds and d) the comparison of vis-IR spectra of the goethite particles (black line) similar to the SiO₂ coated goethite particle spectrum (green line) and to the spectrum of the particles absorbed with Au seeds (red line).

Figure 1. a) Length statistics of the goethite rods, (b,c) TEM micrographs of goethite particles before (b) and after (c) LBL assembly of Au nanoparticles. (d) vis-NIR spectra of the goethite particles (black line), goethite@SiO₂ (green line) and goethite@SiO₂@Au seeds (red line).
Figure S2 shows the topography and amplitude images of the MFM analysis when the sample was exposed to a magnet placed underneath, prior to the MFM measurement. In the magnetic amplitude image we can observe the black contrast corresponding to the particles, indicating that the spins are either all upward or all downward.

Figure S2: MFM height (topography) and amplitude images of goethite particles which have been placed on a magnet (0.2 Tesla), prior to the MFM measurement.
In Figure S3, we plotted the individual spectra for each different length (colored lines) in the distribution for sample C (30 μL seed), taking into account their corresponding statistical weight (which accounts for the weaker intensities of some spectra), together with the combined spectrum (black line). This figure complements Figure 4 in the main body of the paper.

**Figure 3.** Calculated spectra for each length in the measured distribution of sample C (coloured spectra), and for the weighed addition of all spectra (black line).