

Chalcogenide-Gold Dual-layers Coupled to Gold Nanoparticles for Reconfigurable Perfect Absorption

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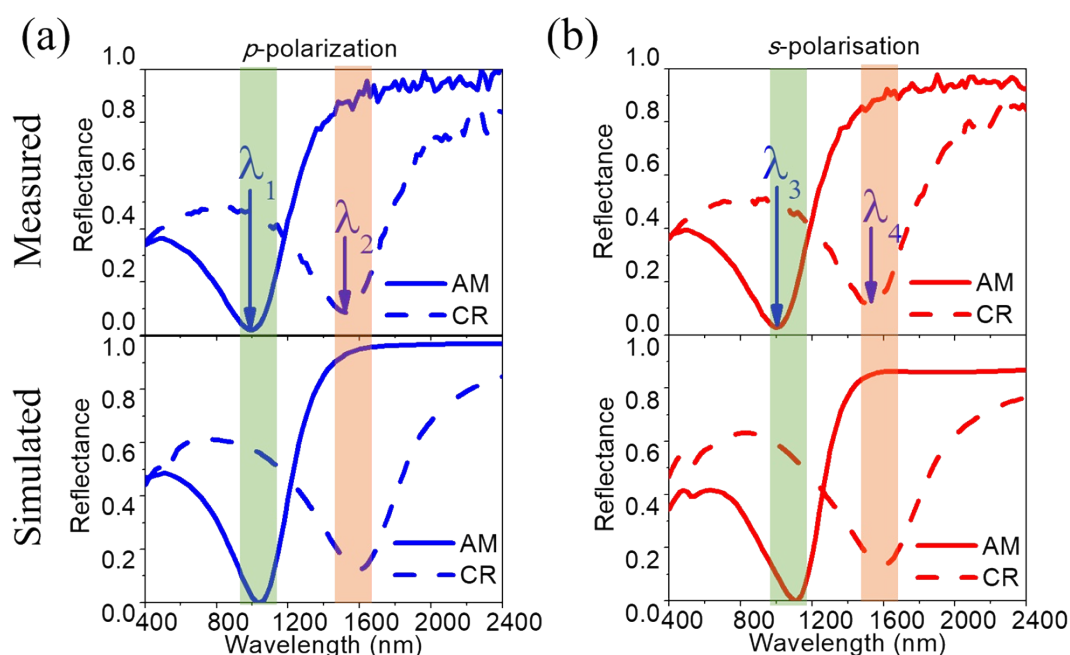


Figure S1. The measured (top panel) and calculated (bottom panel) $R(\omega)$ of structures in both the amorphous (blue lines) and crystalline (red lines) states for (a) p - and (b) s -polarisations, where the incident angle is $\theta = 20^\circ$.

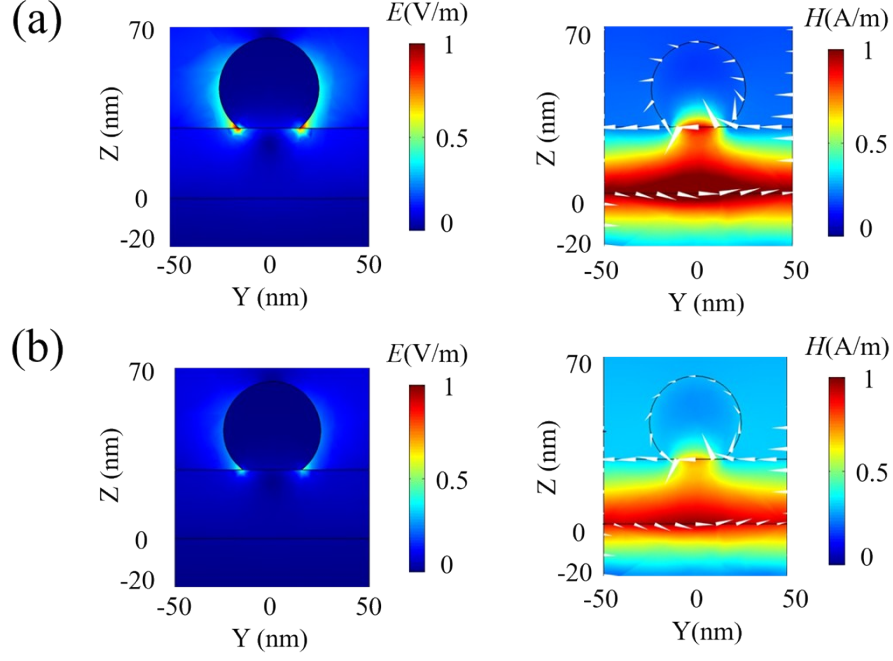


Figure S2. The normalized total E -field intensity, H -field intensity, and J_D distributions along the β plane (x - z plane) at the resonant wavelengths of the absorbers with the different GST states of (a) amorphous at $\lambda_3 = 1000$ nm, and (b) crystalline at $\lambda_4 = 1540$ nm, where the absorber is illuminated by the linearly s -polarised plane wave with an oblique angle of $\theta = 20^\circ$.

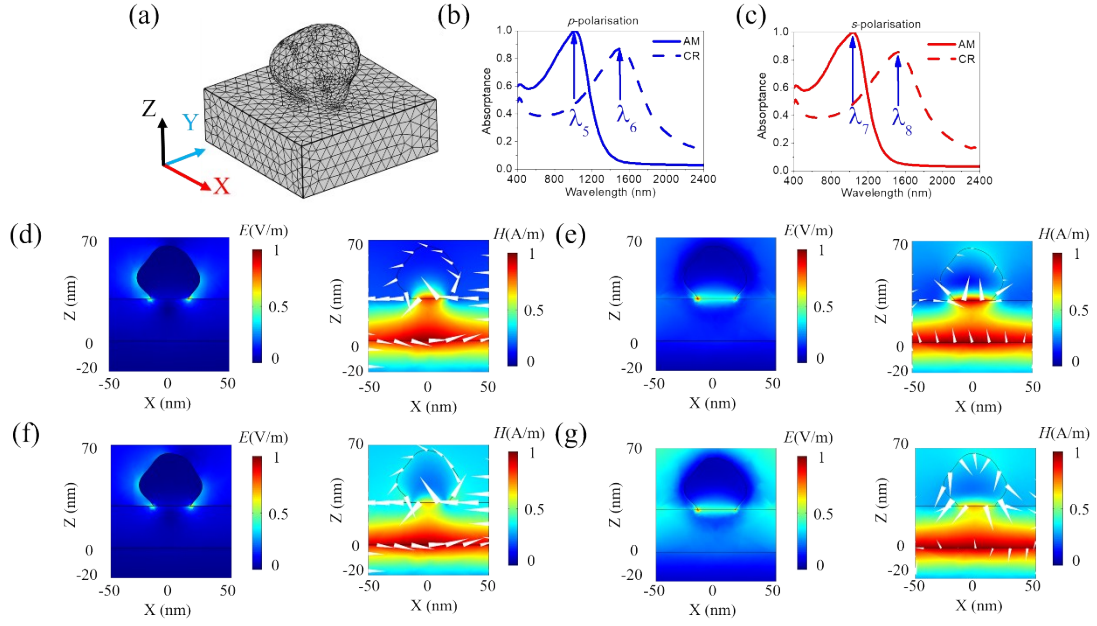


Figure S3. (a) The Comsol model that was employed to calculate the total absorbance and electromagnetic field distributions. The calculated $A(\omega)$ of the hybrid devices with distorted Au nanoparticles in both the amorphous (solid lines) and crystalline (dashed lines) states for (b) p - and (c) s - polarisations with $\theta = 20^\circ$. (d-g) The normalized total E -field intensity, H -field intensity, and J_D distributions along the β plane (x - z plane) at the resonant wavelengths of the absorbers with the different GST states: (d) amorphous at $\lambda_5 = 980$ nm, (f) crystalline at $\lambda_6 = 1520$ nm, where the linearly p -polarised plane wave illuminates the absorber with $\theta = 20^\circ$; (e) amorphous at $\lambda_7 = 980$ nm, (g) crystalline at $\lambda_8 = 1520$ nm, where the linearly s -polarised plane wave illuminates the absorber with $\theta = 20^\circ$.

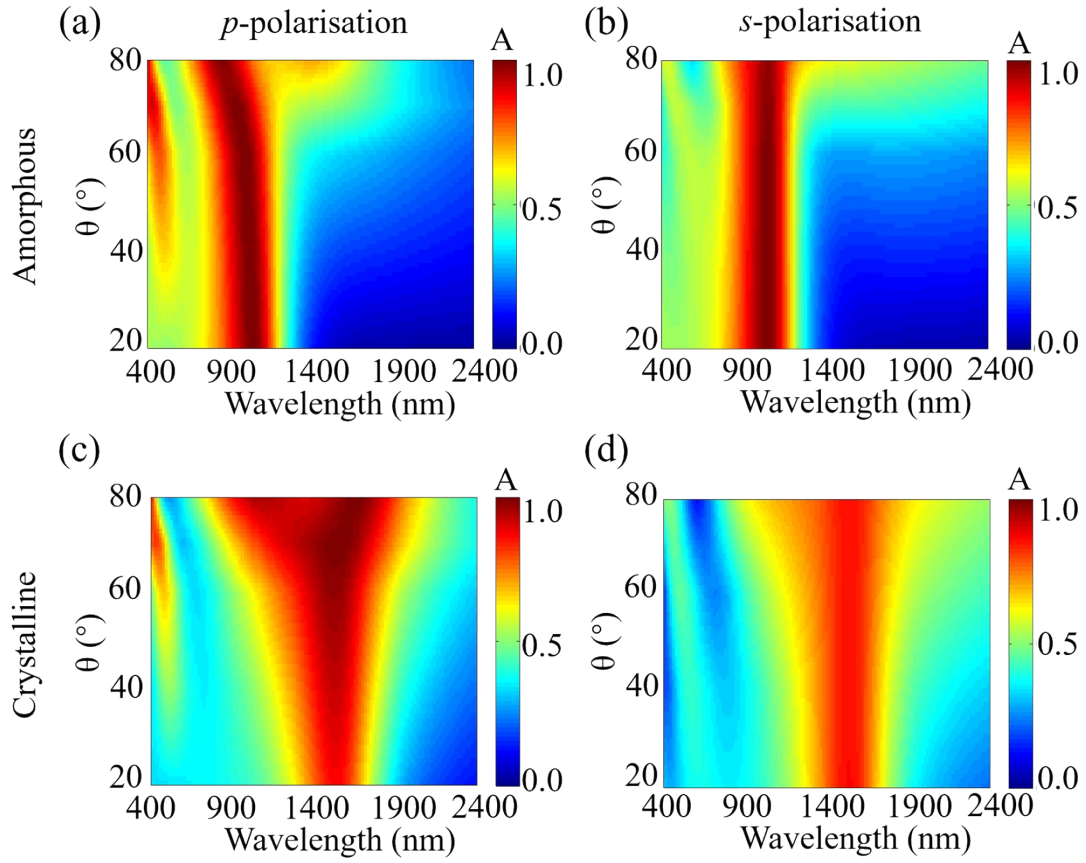


Figure S4. Simulation of angular dispersions of the absorptance peaks (a)-(b) for the amorphous GST at (a) p - polarisation, (b) s - polarization; (c)-(d) for the crystalline GST at (c) p - polarisation, (d) s - polarisation.

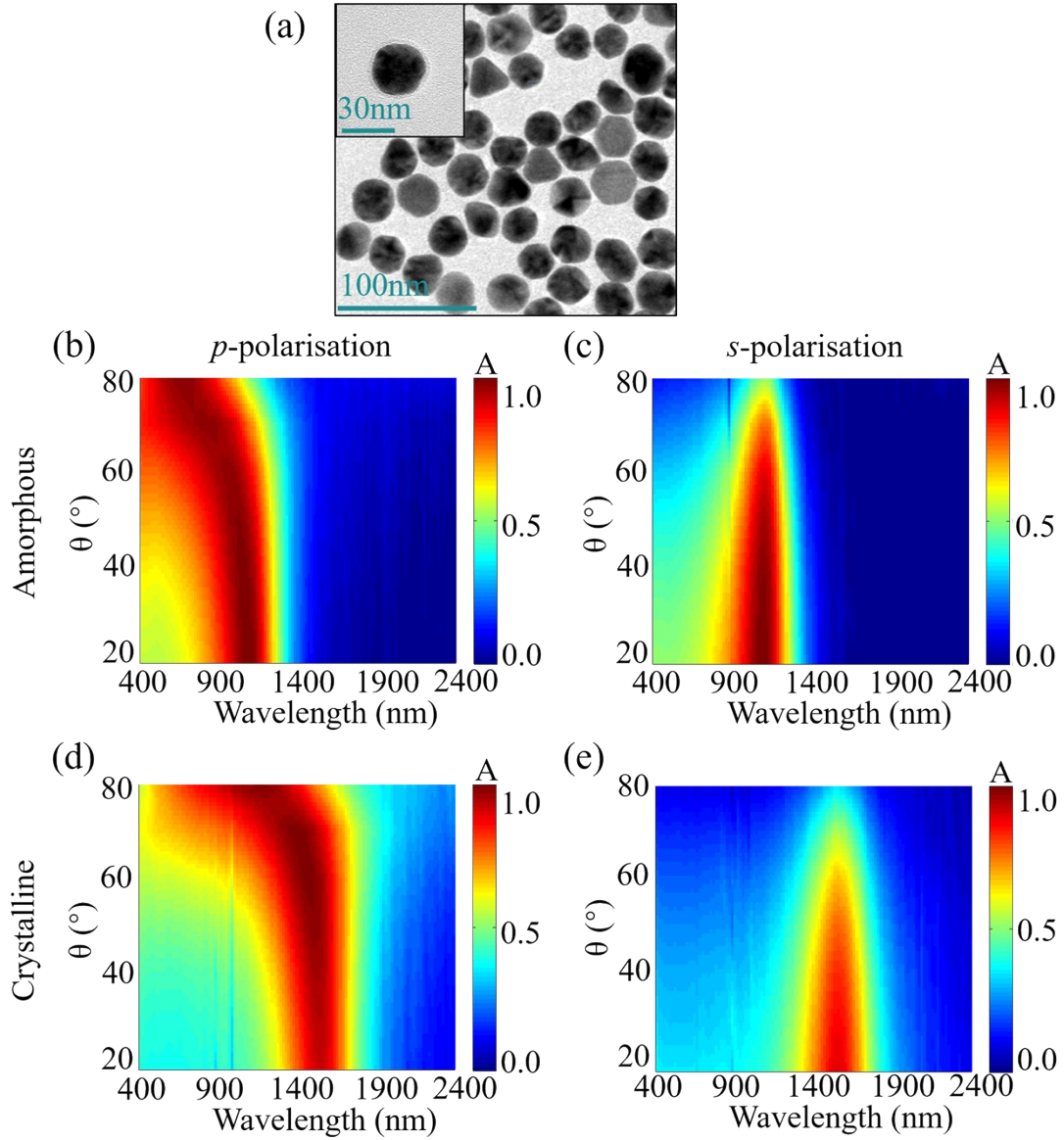


Figure S5 (a) A transmission electron microscopy (TEM) picture of the fabricated device as viewed in the x - y plane perpendicular to the incident light. The inset shows a TEM image of single Au NP with a mean diameter of 30 nm. Measurement of angular dispersions of the absorptance (b)-(c) for the amorphous GST at (b) p -polarisation, (c) s -polarisation; (d)-(e) for the crystalline GST at (d) p -polarisation, (e) s -polarisation.

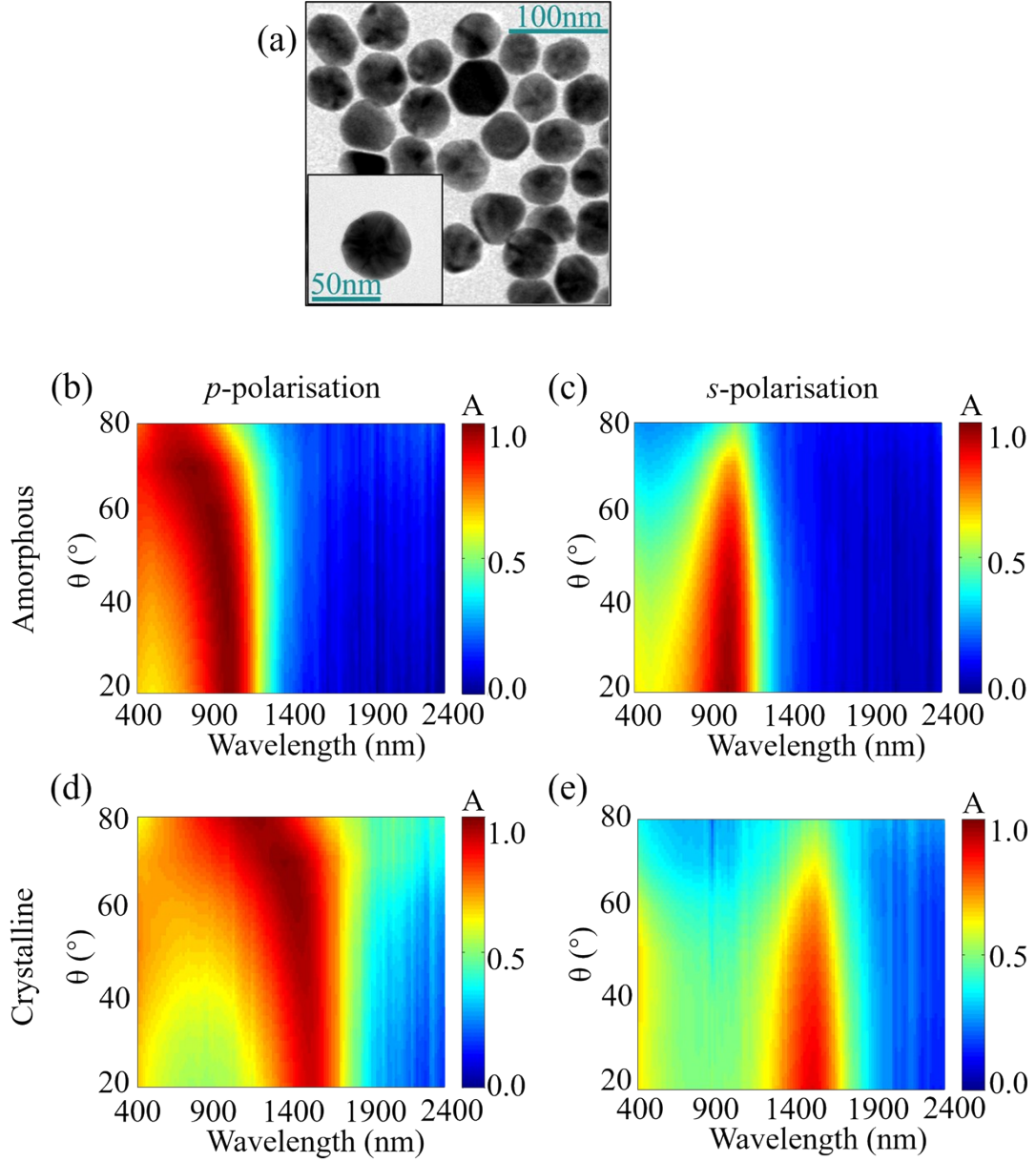


Figure S6 (a) A transmission electron microscopy (TEM) picture of the fabricated device as viewed in the x - y plane perpendicular to the incident light. The inset shows a TEM image of single Au NP with a mean diameter of 50 nm. Measurement of angular dispersions of the absorbance (b)-(c) for the amorphous GST at (b) *p*-polarisation, (c) *s*-polarisation; (d)-(e) for the crystalline GST at (d) *p*-polarisation, (e) *s*-polarisation.

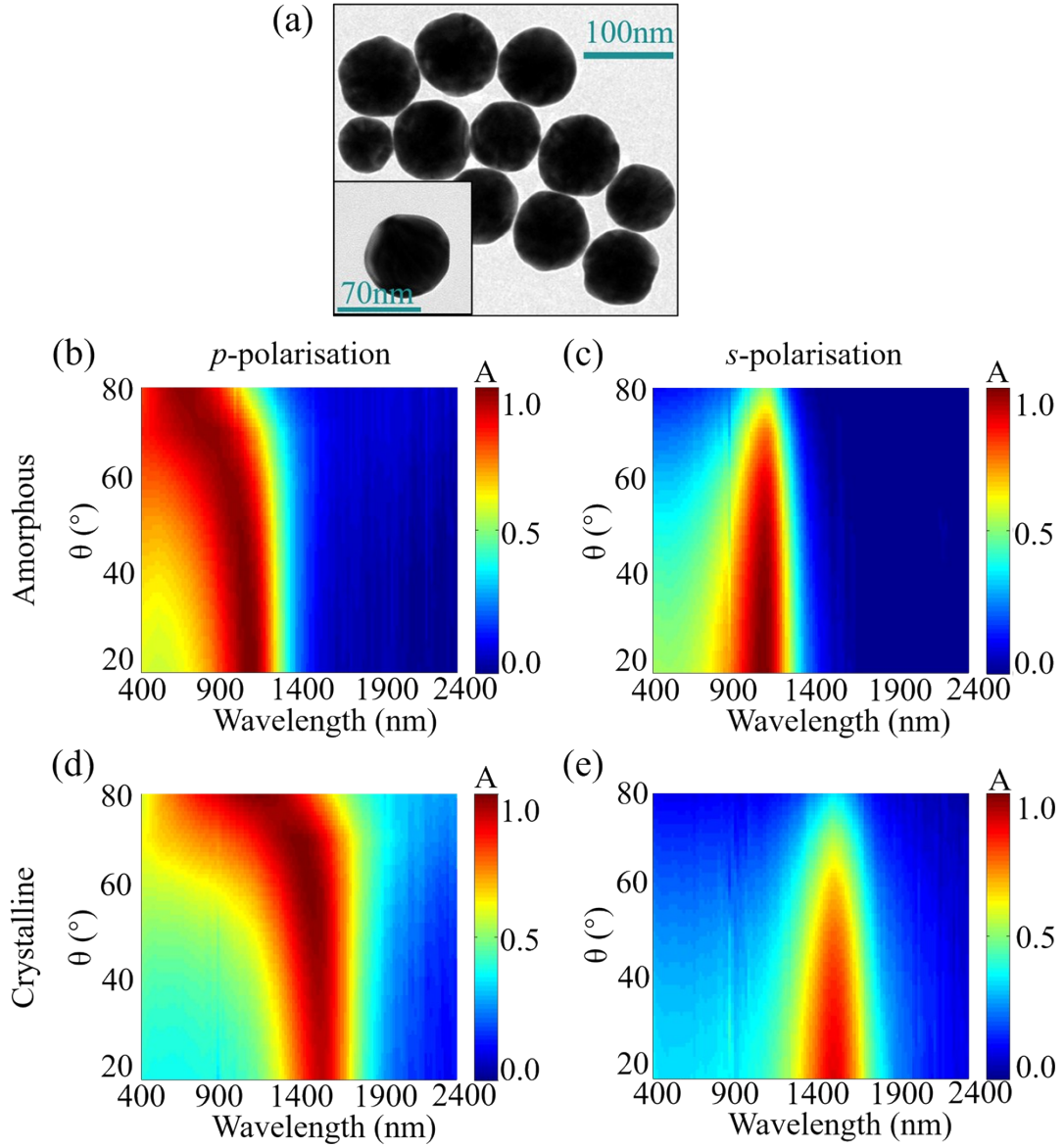


Figure S7 (a) A transmission electron microscopy (TEM) picture of the fabricated device as viewed in the x - y plane perpendicular to the incident light. The inset shows a TEM image of single Au NP with a mean diameter of 70 nm. Measurement of angular dispersions of the absorptance (b)-(c) for the amorphous GST at (b) p -polarisation, (c) s -polarisation; (d)-(e) for the crystalline GST at (d) p -polarisation, (e) s -polarisation.

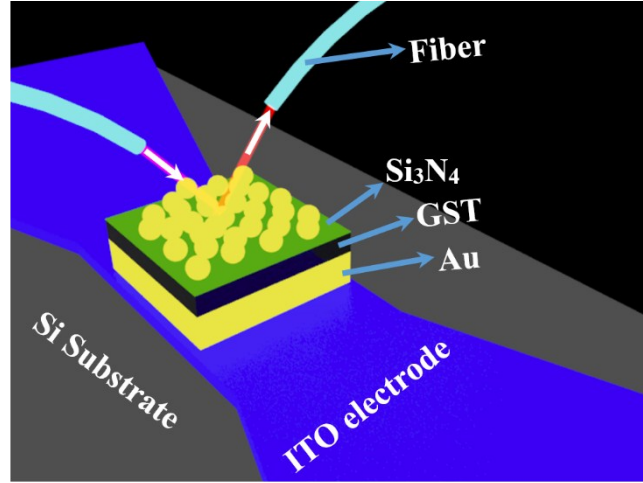


Figure S8. Scheme of a line cell absorber. The absorber is on the top of the ITO line electrodes.

In Table S1, we summarize thermoelectric properties for GST, Au, and Si.

Table S1. Material thermal properties used in the Heat transfer model

	Special heat capacity CS (J / (Kg · K))	Density $\rho(\text{kg/m}^3)$	Thermal conductivity $k(\text{W}/(\text{m} \cdot \text{k}))$	Electrical conductivity $\sigma(\text{S/m})$	Relative permittivity $\epsilon_{\text{silnr}}(1)$	Seebeck coefficient $S(\text{V/K})$
Au	129 ^[s1]	19300 ^[s1]	317(bulk) ^[s1] , 182 Thickness 100nm ^[s1]	Temperature dependence ^[s2]	6.9 ^[s3]	
Temperature dependence ^[s4] GST		220 ^[s5]	6150 ^[s6]	Temperature dependence ^[s6]	Temperature dependence ^[s7]	Temperature dependence ^[s8]
Temperature dependence ^[s9]						
Si	700 ^[s10]	2329 ^[s11]	130 ^[s12]	0.000252 ^[s13]	11.7 ^[s14]	0.00044 ^[s12]

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