# ***Supporting Information*: Nonscattering-to-Superscattering Switch with Phase-Change Materials**

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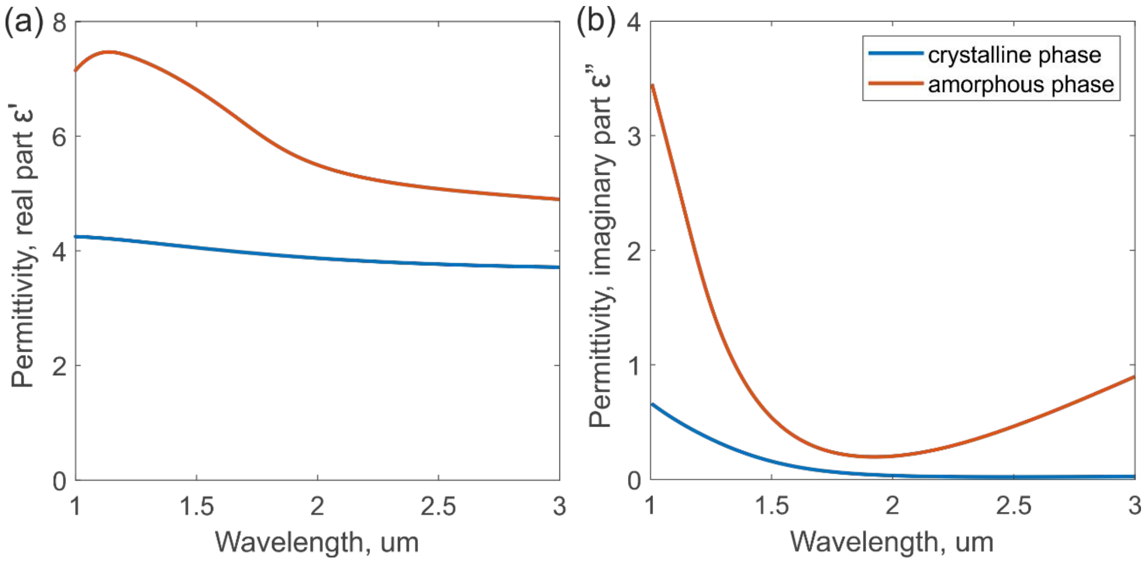


**Figure S1**. (a) Real and (b) imaginary part of dielectric permittivity of phase-change material GeTe used in this work. Red (blue) curves correspond to amorphous (100% crystalline) phase. The data is taken from Ref. [1].

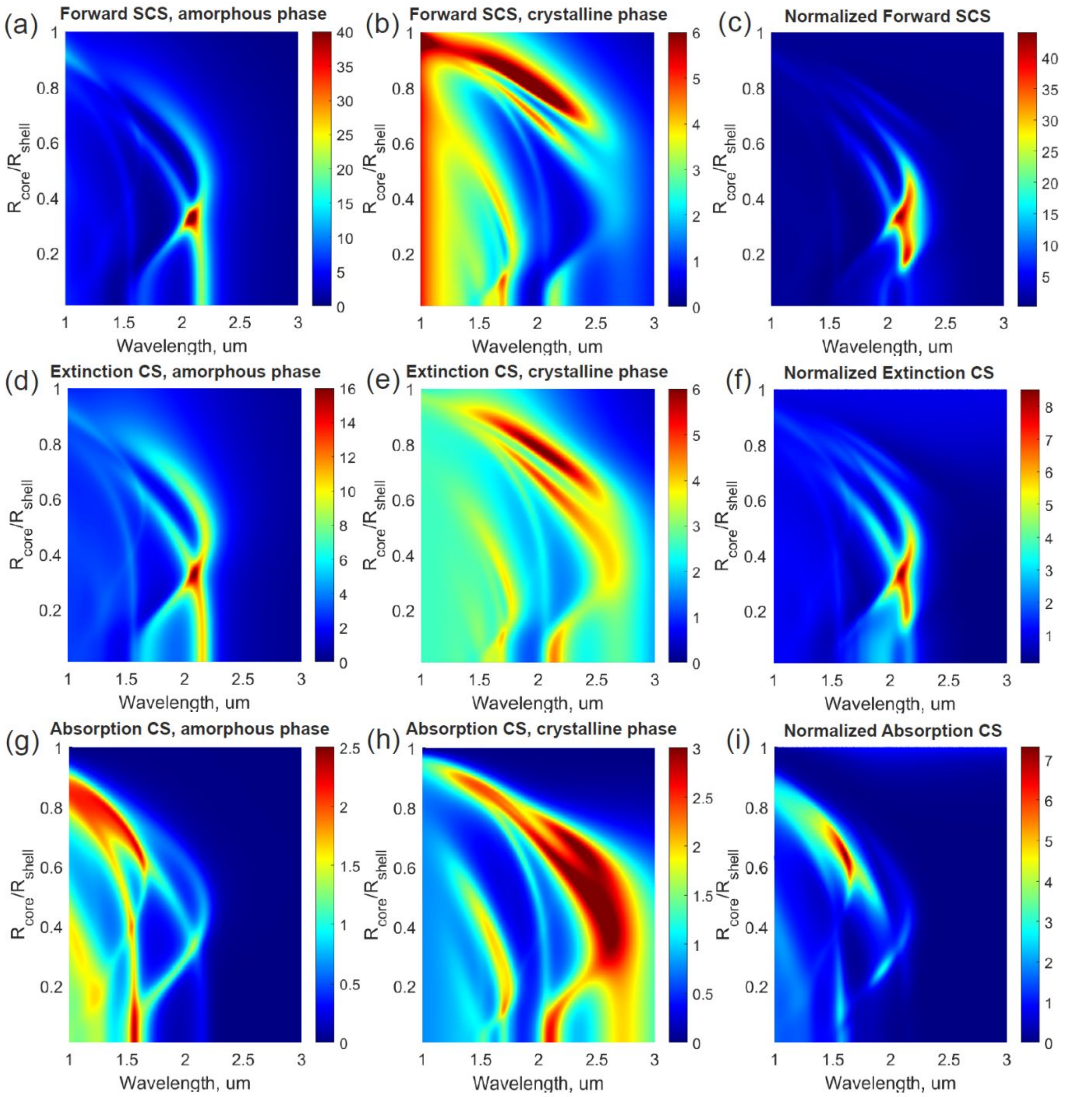


**Figure S2.** (a,b) Forward SCS, (d,e) Extinction CS, and (g,h) Absorption CS of the hybrid Ag-GeTe core-shell nanoantenna versus $R_{core}/R_{shell}$ ratio and the wavelength in (a,d,g) amorphous and (b,e,h) crystalline phase. The shell radius $R_{shell}$ is fixed to 270 nm. (c,e,f) Ratio of Forward SCS, Extinction CS, and Absorption CS of the antenna in the amorphous phase to its SCS in the crystalline phase, respectively. The results for Forward SCS and Extinction CS follow each other in agreement with the optical theorem [2].

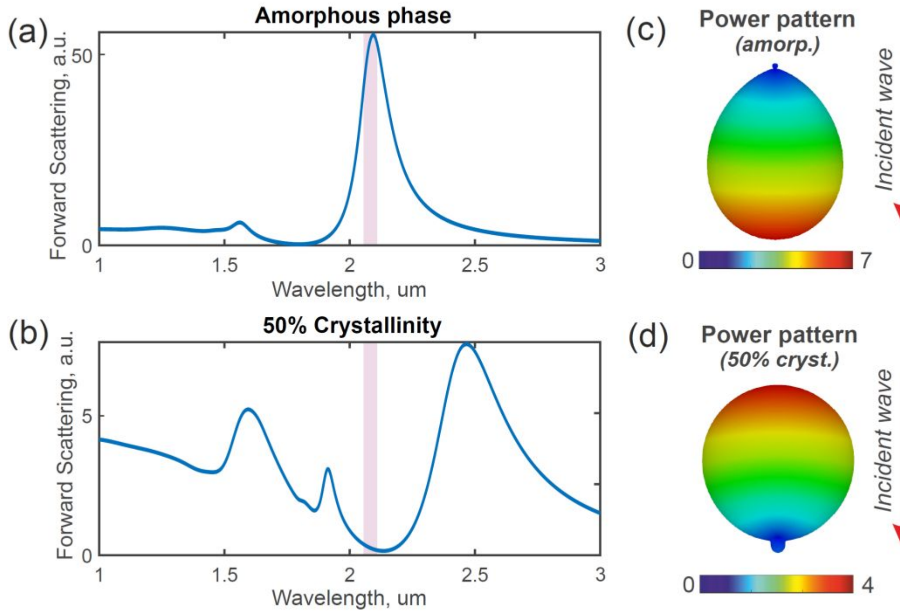


**Figure S3.** Forward scattering intensity of the hybrid nanoantenna with $R_{shell}$ = 270 nm and $R_{core}$ = $0.33R_{shell}$ in (a) the amorphous phase and (b) the 50% crystallinity phase on a top of a silica substrate (refractive index of 1.5) under normal excitation. Scattering power patterns of the antenna in the amorphous phase (c) and 50% phase (d) at 2.1 um. The colorbars represent the value of directivity.

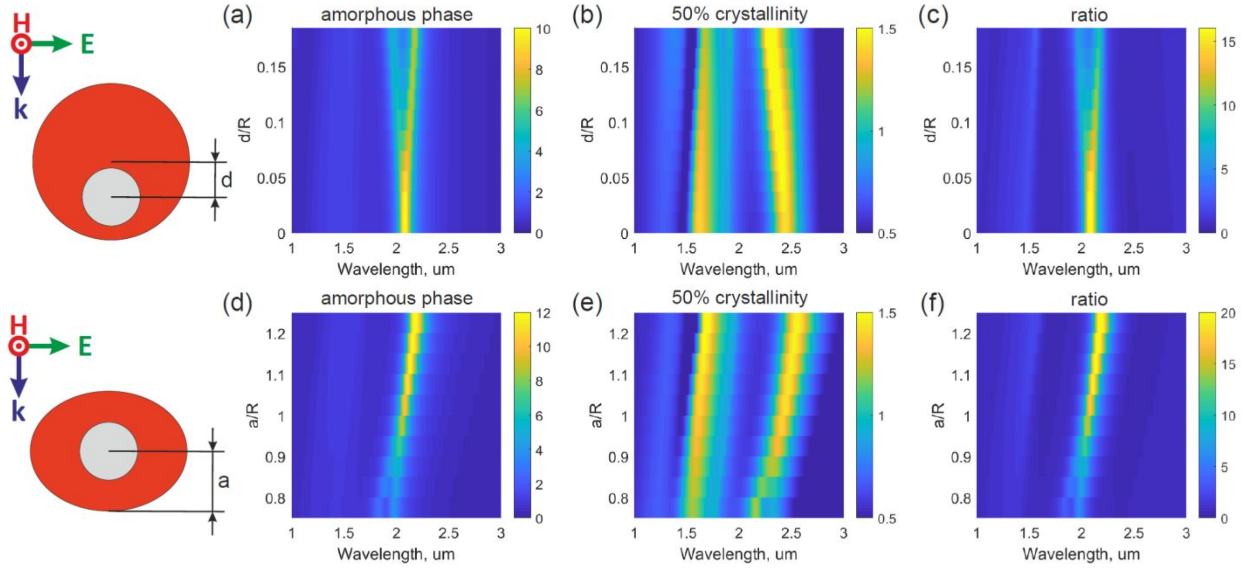


**Figure S4.** SCS of the hybrid Ag-GeTe core-shell nanoantenna versus displacement (*d)* to $R_{shell}$ ratio and the wavelength in (a) amorphous and (b) 50% crystallinity phase. The radius of shell $R_{shell}$ is fixed to 270 nm and $R_{core} = 0.33R_{shell}$. (c) Ratio of SCS of the antenna in the amorphous phase to its SCS in the 50% crystallinity phase versus d/$R_{shell}$ and the wavelength. SCS of the nanoantenna versus stretching factor a/$R_{shell}$ and the wavelength in (d) amorphous and (e) 50% crystallinity phase. The shell radius $R_{shell}$ is fixed to 270 nm and $R_{core} = 0.33R_{shell}$. (f) Ratio of SCS of the antenna in the amorphous phase to its SCS in the 50% crystallinity phase versus displacement d to $R_{shell}$ ratio and the wavelength.

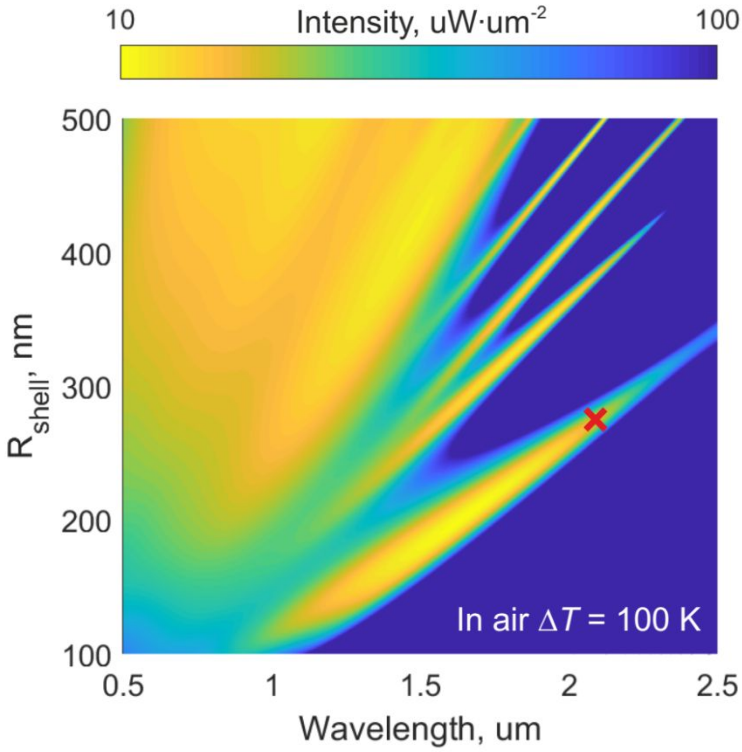


**Figure S5**. Intensity of incident light required to heat the nanoantenna placed in air with $\chi_s = 0.025$ W$\cdot$(mK)$^{-1}$][3] by $\Delta T = 100$ K. We use the well-known analytical approach reported in Ref. [3], [4]. The temperature increase needed to achieve phase changing in GeTe (~200 K and determined by the required speed of phase changing) is much less than the melting temperature of Ag nanoparticles of a considering size (~1230 K), which is far away from the size-dependent effects [5].

## References

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