

## Supporting Information:

# Theoretical Realization of Robust Broadband Transparency in Ultrathin Seamless Nanostructures by Dual Blackbodies for Near Infrared Light

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## 1. Comparison of transmittance between structures with and without middle silver film

As shown in Figures S1, without Ag film, transmittance for wavelength larger than 1220 nm is much higher than that of structure with Ag film. This deteriorates the performance of band pass transmission.

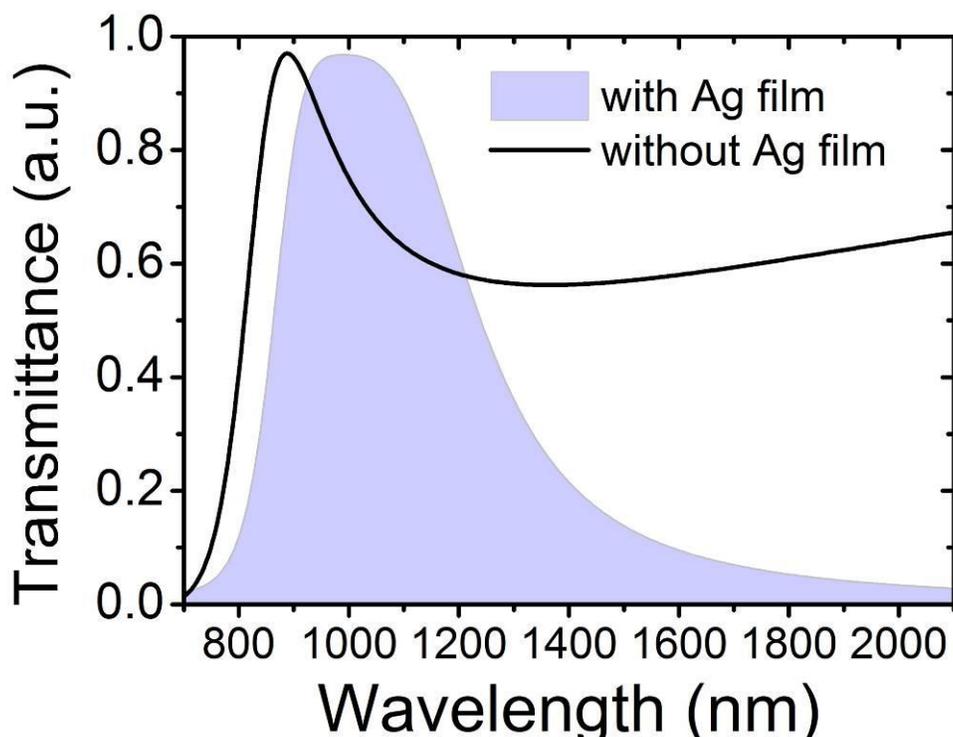


Figure S1 Comparison of transmittance spectra between structures with (light purple area) and without Ag film (solid line) at the middle. The parameters for calculating structure with Ag film are  $p = 150$  nm,  $t = 40$  nm,  $r = 60$  nm,  $d = 20$  nm and  $h = 20$  nm. The curve without Ag film is simulated by replacing Ag film by a layer of  $\text{Al}_2\text{O}_3$  with the same thickness and keeping other parameters unchanged.

## 2. Transmittance spectra for structures with different thicknesses of Ag film.

Thickness of middle Ag film plays an important role in the interaction between upper and lower layers. If its thickness is too thick, coupling is forbidden because no light can penetrate it. If it is too thin, unexpected transmission will make the transmission band obscure. As shown in Figure S2, the structure with  $h = 0$  provides a relative high transmittance spectrum for wavelength

longer than 1220 nm. For other  $h$ , the transmission peak almost keeps around 990 nm. Thinner  $h$  supports strong interaction between upper and lower modes, so the resonant mode splits with a larger separation. As  $h$  increases, their interaction gets weaker. When  $h = 20$  nm, two modes degenerate and form a broad and flat transmission band. Further increase in  $h$  leads to a decrease in transmission due to more light being blocked by the middle film.

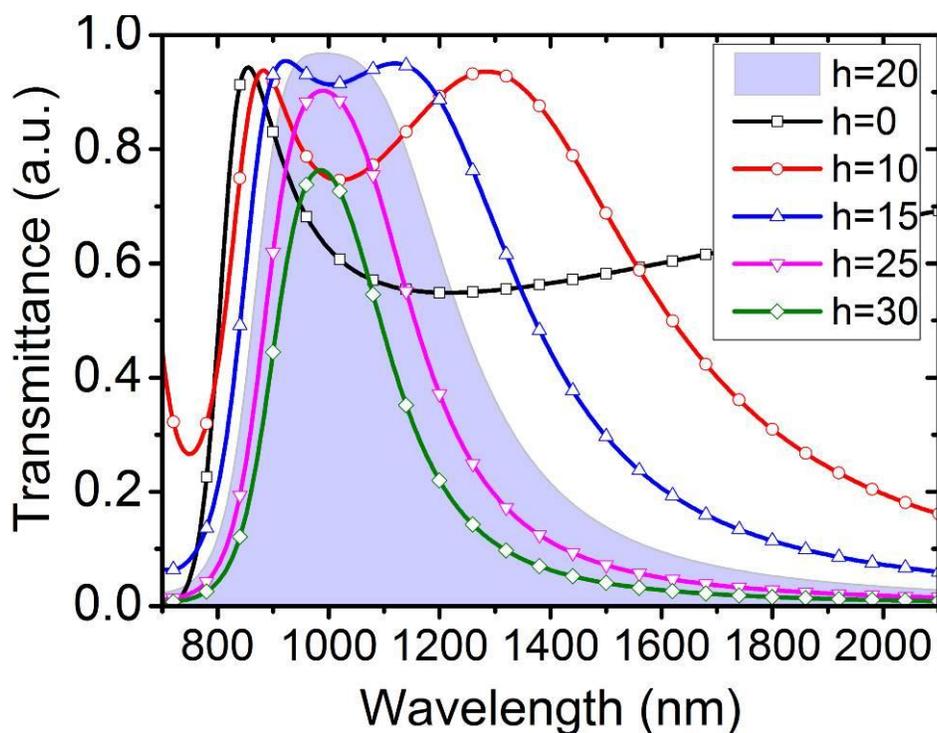


Figure S2 Transmittance spectra of structures with different thicknesses of Ag film.  $h$  is in unit of nm. Other parameters are  $p = 150$  nm,  $t = 40$  nm,  $r = 60$  nm and  $d = 20$  nm.