Supporting Information

Ultra-broadband, lithography-free, omnidirectional, and polarization-insensitive perfect absorber

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Section 1. Optical Properties of Cr, Au and Ag

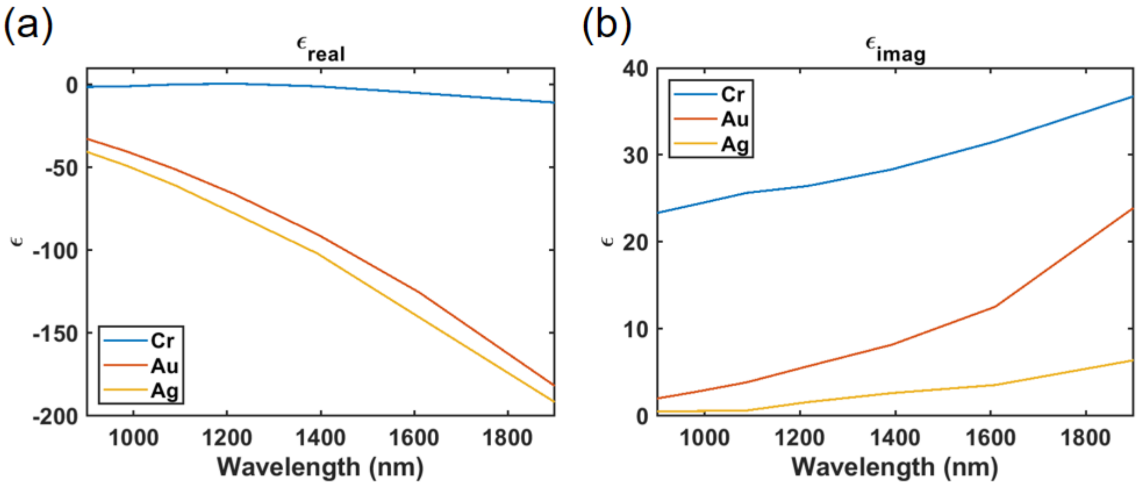

Figure S1. Optical properties of Cr, Au and Ag within working wavelength range. (a) Real part of the permittivity. (b) Imaginary part of the permittivity

Section 2. Absorption performance on the geometry of sweeping thickness of top dielectric layer (t_t)

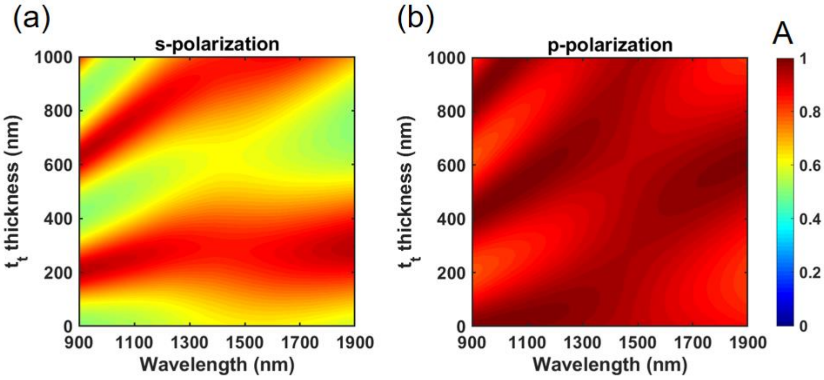

Figure S2. Absorbance spectrum plotted as a function of wavelength and the thickness of the top dielectric layer (t_t) when t_d = 180 nm and t_c = 7 nm under 70° incidence angle in (a) s- and (b) p-polarized.

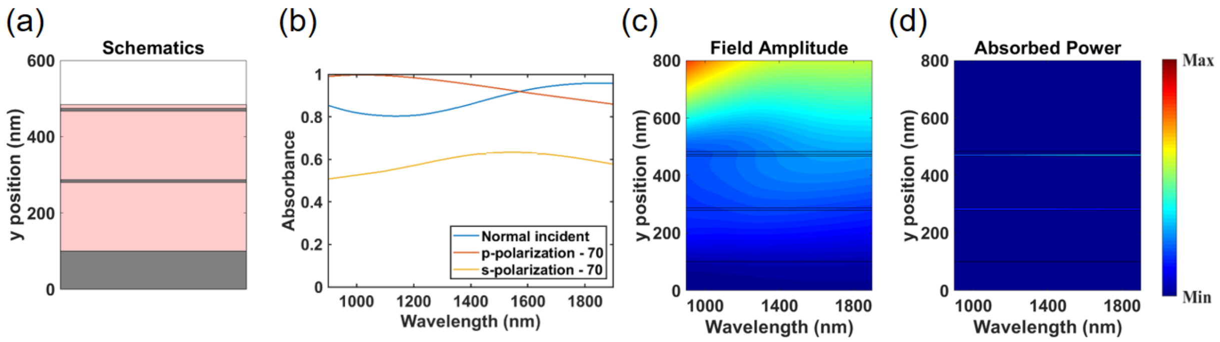

Figure S3. Simulation results with t_t = 10 nm, t_c = 7 nm and t_d = 180 nm. (a) Schematic figure. The multilayer along y-axis is respectively, Cr (0-100 nm), MgF_2 (100-280 nm), Cr (280-287 nm), MgF_2 (287-467 nm), Cr (467-474 nm), MgF_2 (474-484 nm). (b) Calculated absorbance spectra obtained under s-polarized and p-polarized light at normal and oblique incidence angles. (c) Field amplitude and (d) absorbed power along the direction of propagation as a function of the wavelength at 70 incidence angles under s-polarized light.

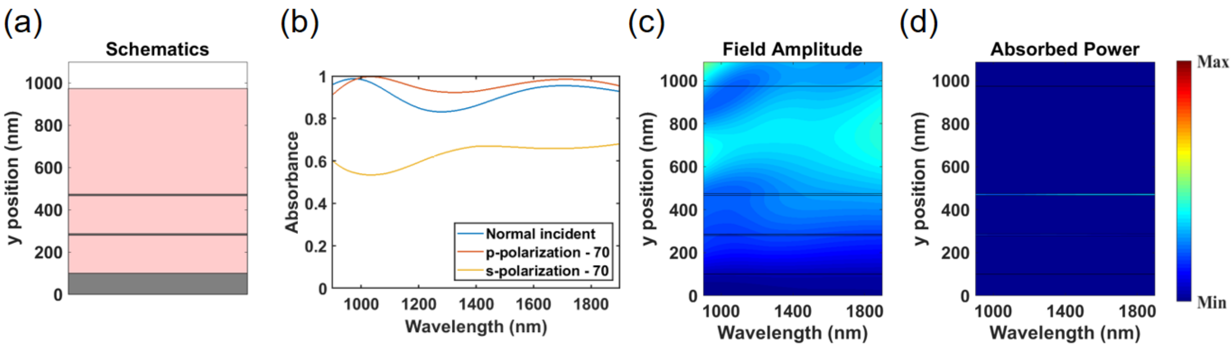

Figure S4. Simulation results with t_t = 500 nm, t_c = 7 nm and t_d = 180 nm. (a) Schematic figure. The multilayer along y-axis is respectively, Cr (0-100 nm), MgF_2 (100-280 nm), Cr (280-287 nm), MgF_2 (287-467 nm), Cr (467-474 nm), MgF_2 (474-974 nm). (b) Calculated absorbance spectra obtained under s-polarized and p-polarized light at normal and oblique incidence angles. (c) Field amplitude and (d) absorbed power along the direction of propagation as a function of the wavelength at 70 incidence angles under s-polarized light.

Section 3. Absorption performance on the geometry of sweeping thickness of metallic layer (t_c)

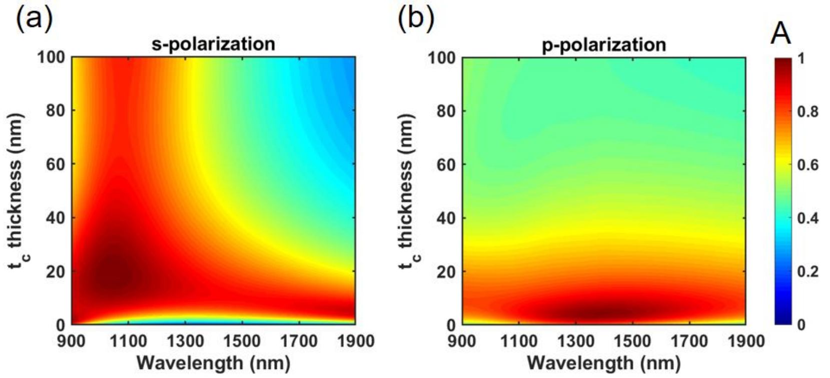

Figure S5. Absorbance spectrum plotted as a function of wavelength and the thickness of the metallic layer (t_c) when t_t = 230 nm and t_d = 180 nm under 70° incidence angle in (a) s- and (b) p-polarized.

Section 4. Absorption performance on the geometry of sweeping thickness of middle dielectric layer (t_d)

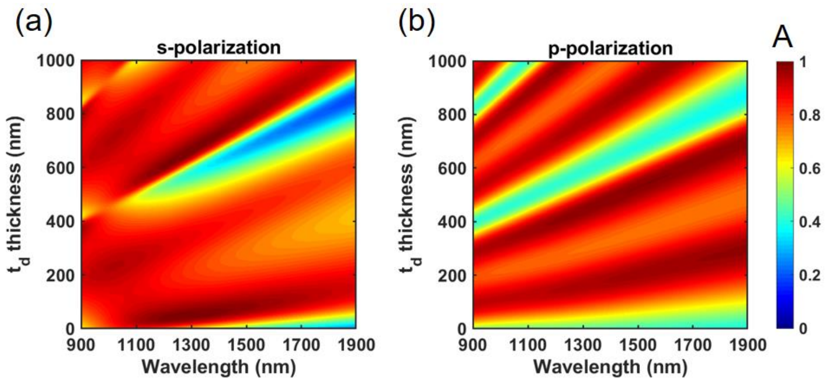

Figure S6. Absobance spectrum plotted as a function of wavelength and the thickness of the middle dielectric layer (t_d) when t_t = 230 nm and t_c = 7 nm under 70° incidence angle in (a) s- and (b) p-polarized.

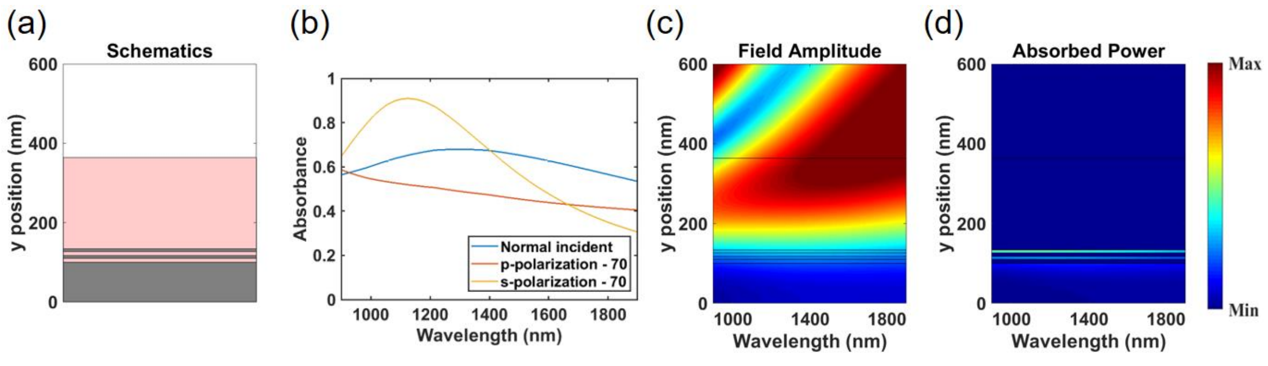

Figure S7. Simulation results with t_t = 230 nm, t_c = 7 nm and t_d = 10 nm. (a) Schematic figure. The multilayer along y-axis is respectively, Cr (0-100 nm), MgF_2 (100-110 nm), Cr (110-117 nm), MgF_2 (117-127 nm), Cr (127-134 nm), MgF_2 (134-364 nm). (b) Calculated absorbance spectra obtained under s-polarized and p-polarized light at normal and oblique incidence angles. (c) Field amplitude and (d) absorbed power along the direction of propagation as a function of the wavelength at normal incidence.

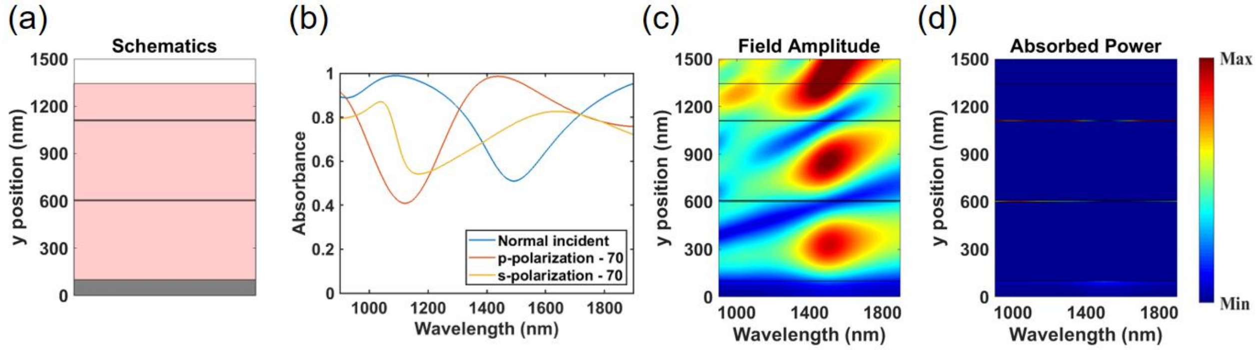

Figure S8. Simulation results with t_t = 230 nm, t_c = 7 nm and t_d = 500 nm. (a) Schematic figure. The multilayer along y-axis is respectively, Cr (0-100 nm), MgF_2 (100-600 nm), Cr (600-607 nm), MgF_2 (607-1107 nm), Cr (1107-1114 nm), MgF_2 (1114-1344 nm). (b) Calculated absorbance spectra obtained under s-polarized and p-polarized light at normal and oblique incidence angles. (c) Field amplitude and (d) absorbed power along the direction of propagation as a function of the wavelength at normal incidence.