Supplementary materials

Contents

S1. Refractive indexes of tungsten and SiO_2

Refractive indexes of tungsten and SiO_2 are presented in **Figure S1**.

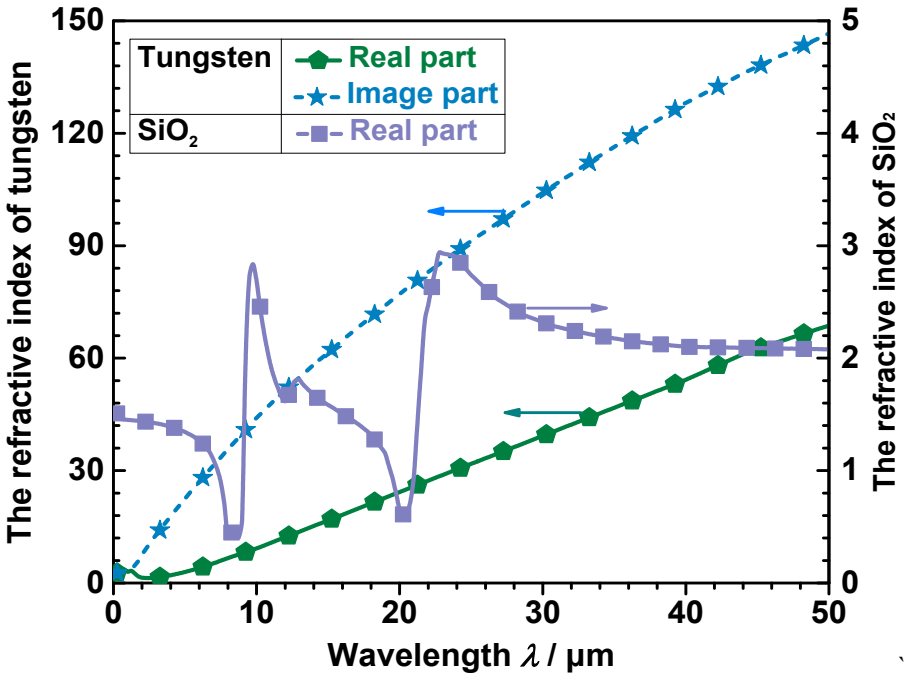

Figure S1 The refractive indexes of tungsten and SiO_2.[1, 2]

S2.Grid independence test

To make sure that the simulation results are insensitive to the mesh number, the proposed MA with the parameters of p=155 nm, h_1=150 nm, h_2=10 nm, h_3=20 nm, h_4=10 nm, d_1=150 nm, h_5=240 nm, d_2=130 nm, h_6=70 nm, d_3=80 nm and h_7=70 nm was chosen as the typical case for the grid independence checking. Four grid systems with different grid numbers were established, and the solar absorptivity (α_{sol}) of the proposed MA under normal incident wave with a magnetic field in the y direction (i.e., TM polarized wave) was calculated. It is manifest from the **Table S1** that the variation of α_{sol} is less than 0.0001 when the grid number increases from 175,966 to 458,366. Considering the accuracy and time of the simulation, the grid number selected for this case is 175,966. Besides, similar grid checking has also been performed with other cases.

Table S1 Grid independence check.

Grid system	Grid number	Solar absorptivity α_{sol}
1	26,146	0.9613
2	79,133	0.9593
3	175,966	0.9591
4	458,366	0.9590

S3.Model validation

To validate the current model, the transport process of solar radiation in an absorber with a nanodisk array was simulated by the finite element method (FEM), and all the structure parameters were kept the same with Han et al.[3]

Its spectral absorptivity (α_λ) under normally incident wave with a magnetic field in the y direction (i.e., TM polarized wave) was calculated by present model and Han et al's model, as demonstrated in **Figure S2**. It is manifest from the **Figure S2** that the deviations between the results of the current model and Han et al. are smaller than 0.019 within 0.498-2.5 μm, suggesting that the results are in good agreement within this wavelength range. [3] Although there is a slight deviation between the two curves due to differences in optical properties and model settings when λ<0.498 μm, the present model can still be considered reliable.

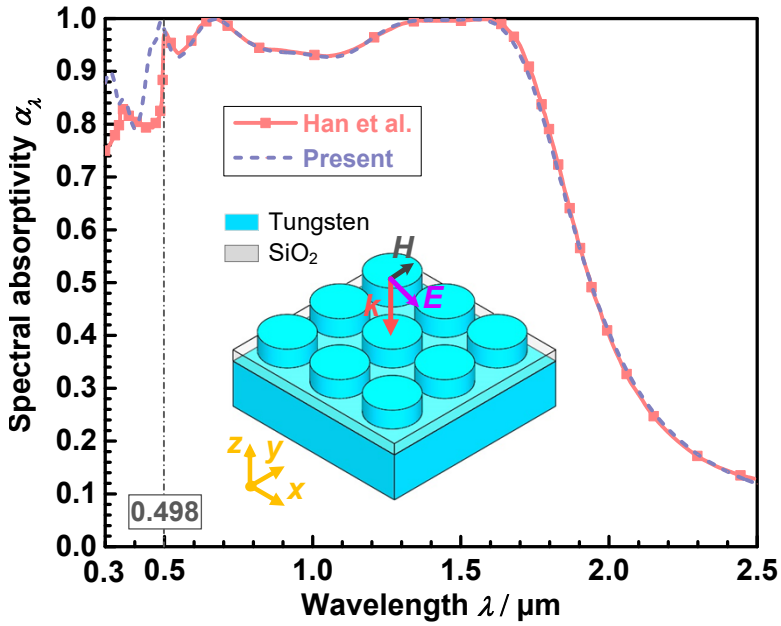

Figure S2 Present results versus Han et al.'s results.[3]

References

1. E. D. Palik, *Handbook of optical constants of solids*, Academic press, San Diego, California, 1998.
2. A. D. Rakić, A. B. Djurišić, J. M. Elazar and M. L. Majewski, *Appl. Opt.*, 1998, **37**, 5271-5283.
3. X. Han, K. He, Z. He and Z. Zhang, *Opt. Express*, 2017, **25**, A1072-A1078.