**Supporting Information**

# Broadband near-field enhancement in macro-periodic and micro-random structure with a hybridized excitation of propagating Bloch-Plasmonic and localized surface-plasmonic modes

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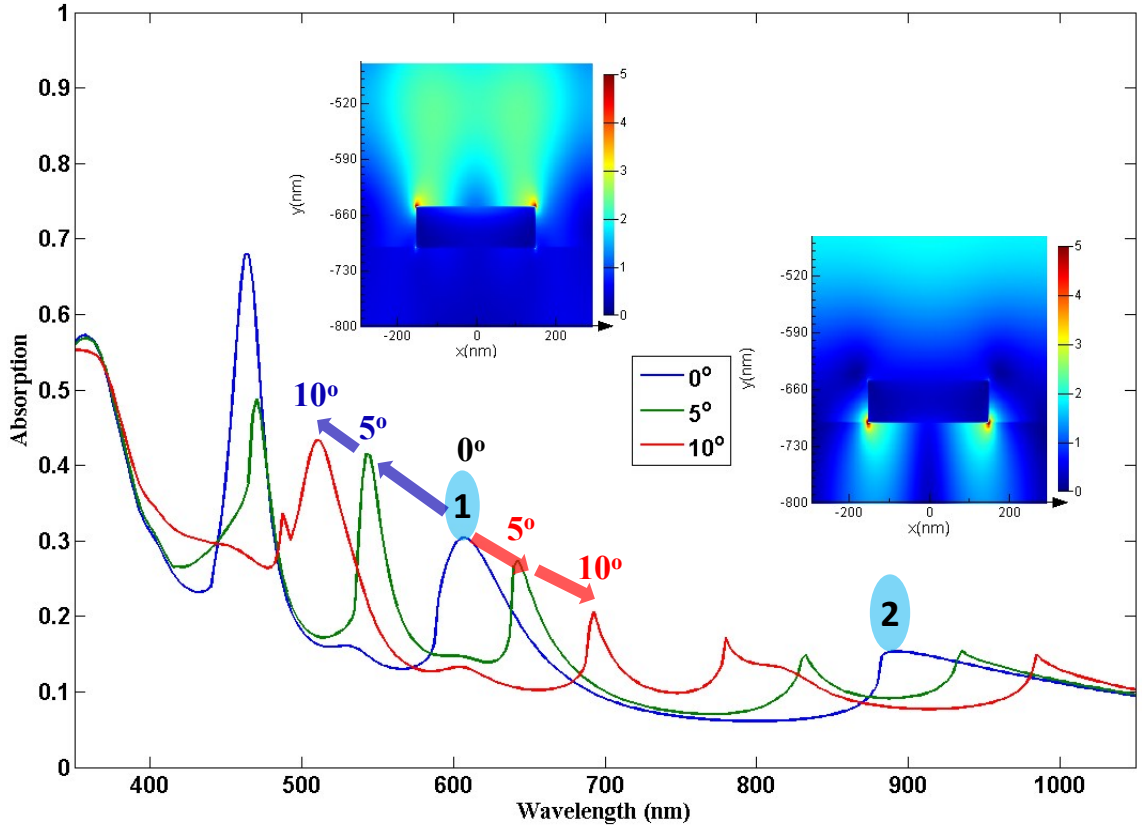


Figure S1. Simulated absorption spectra of a perfect metal strip grating (600 nm in periodicity, 300 nm in strip width, and 50 nm in strip height) under 0, 5, and 10 degree illumination obtained by the finite-difference time-domain method.[1,2] The resonant peaks 1 and 2 represent the plasmon-floquet modes generated at the interference of Ag/Air and Ag/Glass, respectively. Regarding to the momentum matching condition,

$k_x=k_{inc}\cdot sin(\theta)\pm 2\pi/P$, the resonant peak will spilt into two peaks: one is red-shift and another one is blue-shift as increasing the incidence angle ($\theta$), respectively.

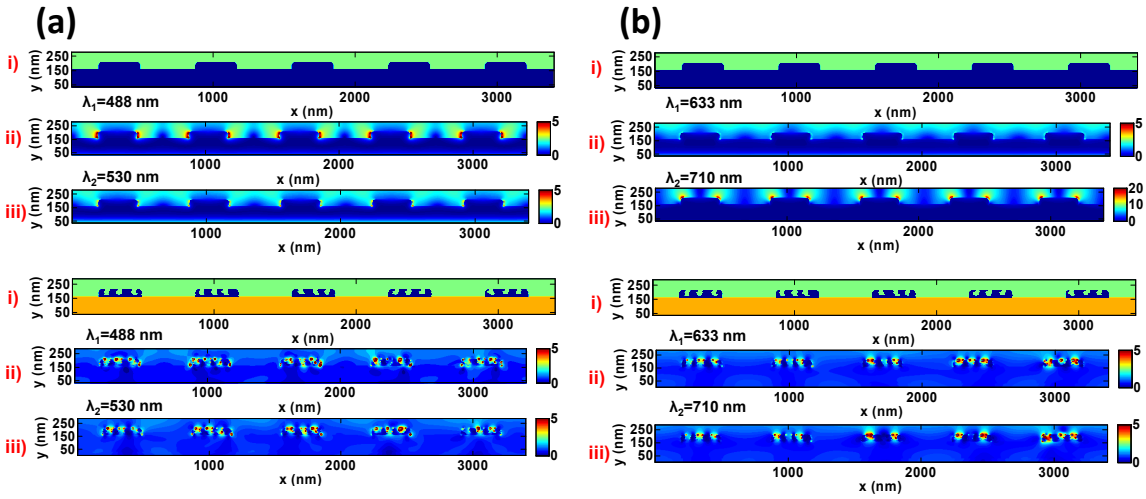


Figure S2. Structures and corresponding simulated electric field profiles under excitation of (a) 488 nm, (b) 633 nm and their corresponding emission wavelengths. The pattern parameters are the same as in Figure 3.

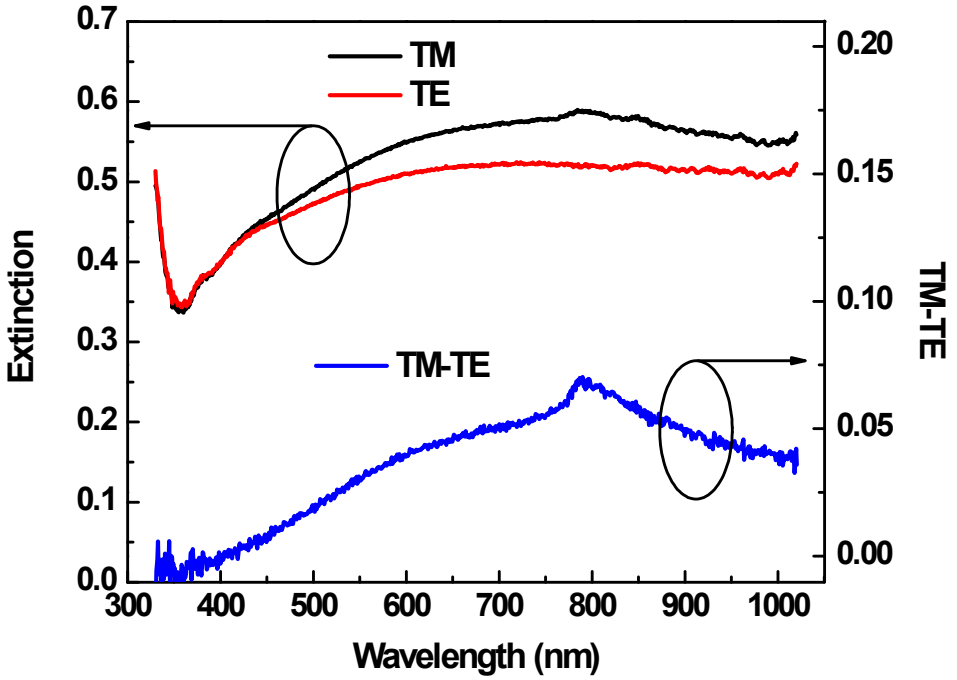

Figure S3. Extinction spectra of 1D macro-periodic and micro-random structure under two polarized light: TM (black) and TE (red), and extinction difference between the two modes (blue).

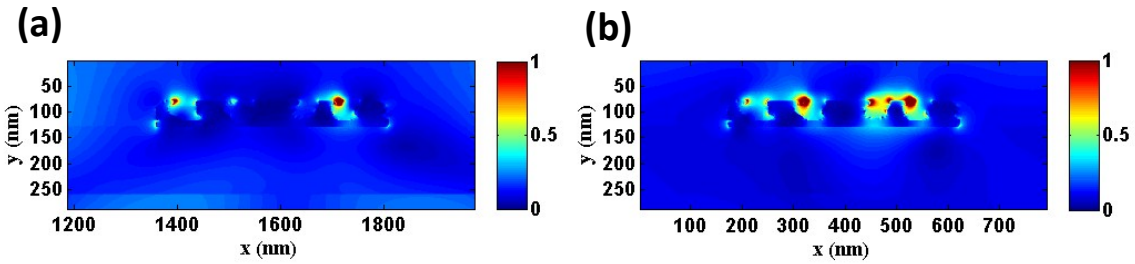


Figure S4. Near field distributions of a typical silver strip on glass substrate obtained through FDTD method under (a) PML and (b) periodic boundary conditions separately (Period is 790 nm) at 790 nm excitation. The parameters of typical 2D silver strip with random structure inside are 450 nm in strip width and 50 nm in strip height with glass as substrate.

## References

1. W. E. I. Sha, W. C. H. Choy, and W. C. Chew, Opt. Express **18** (6), 5993 (2010).

2. X. G. Ren, Z. X. Huang, X. L. Wu, S. L. Lu, H. Wang, L. Wu, and S. Li, Comput. Phys. Commun. **183** (6), 1192 (2012).