[An Investigation of the Polariton-Plasmon Coupling in hBN on Nanopatterned Ag Layered Structures] An Investigation of the Polariton-Plasmon Coupling in hBN on Nanopatterned Ag Layered Structures[Note1]

Electromagnetic simulations were performed using the Finite-Difference Time-Domain (FDTD) method using an in-house designed code. The FDTD method numerically integrates the Maxwell curl equations with second-order accuracy as detailed in Ref.[1].

The details of the nanopatterned structure simulated in this work are shown in Figure 1. The structure comprised of an 80 nm sheet of hexagonal boron nitride (hBN) deposited on a 50 nm thick film of nanopatterned Ag atop of a Si substrate. The Ag film was patterned with circular holes of radius 0.68 μm arranged in a hexagonal lattice with a distance between the centers of d_{CC}, which was varied during this work.

REFERENCES

[Note1]D.J.T Heneghan, W. M. Dennis,2021, *Journal TBD*, Vol. TBD, No. TBD. Reprinted here with permission of publisher and authors.

[1]W. Wan, X. Yang, and J. Gao, “Strong coupling between mid-infrared localized plasmons and phonons,” Opt. Express **24**, 12367–12374 (2016)

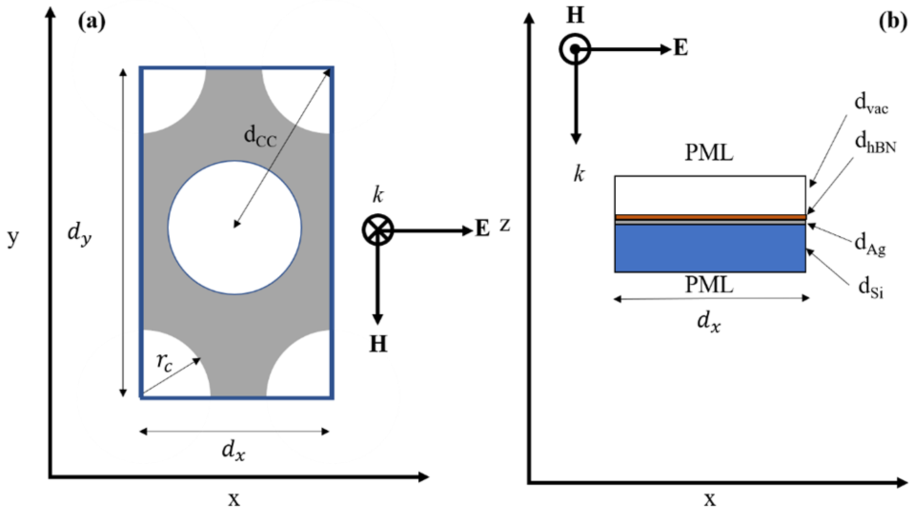

Figure 1. Schematic of the hBN/Ag structure simulated on this work. **(a)** Plane view at the hBN/Ag interface. The symmetry reduced unit cell is outlined in red. **(b)** Cross-sectional view. CPML: Convolutional perfectly matched layer boundary conditions terminated the z direction boundaries. Periodic boundary conditions terminated the x and y boundaries. The unit cell lengths in the x- and y- directions are d_x and d_y, respectively. The layer thicknesses beyond the CPMLs were $d_{\mathrm{VAC}} = 0.87$ μm, $d_{\mathrm{hBN}} = 80$ nm, $d_{\mathrm{Si}} = 1.0$ μm, $d_{\mathrm{Ag}} = 50$ nm. The radius of the holes is $r_C = 0.68$ μm. The distance between the centers of the cylindrical holes is $d_{CC} = d_x$. The directions of the $\boldsymbol{E}$-field, $\boldsymbol{H}$-Field and propagation vector $\boldsymbol{k}$ is shown in both panes.