

Abstract Submitted
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Transmission modulation through sub-wavelength hole arrays in metal-VO₂ double-layer nanostructures J. Y. SUH, E. U. DONEV, R. LOPEZ, L. C. FELDMAN, R. F. HAGLUND JR. , Vanderbilt University — Nanoscale optical systems require active devices able to control light in sub-wavelength structures. We report the use of a unique double layer structure which provides this function. Enhanced transmission of near-infrared light through a sub-wavelength hole arrays patterned in Ag-VO₂ and Au-VO₂ double-layer films shows that it is possible to modulate transmitted intensity by means of a semiconductor-to-metal phase transition in VO₂. The transmitted intensity in the near-infrared for the metallic phase of VO₂ is a factor of ~ 10 greater than the intensity for the semiconducting phase. We explain this modulation in terms of the switchable permittivity difference of the VO₂ phases.

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