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Optimization of dual-width plasmonic nanogap gratings with substrate thickness for optical enhancement applications. STEPHEN BAUMAN, AHMAD DARWEESH, JOSEPH HERZOG, University of Arkansas — Dual-width plasmonic gratings have been previously shown to demonstrate additional light enhancement over standard single-width gratings. This benefit is further increased by utilizing sub-10 nm gaps between the grating structures. Optimization of the grating geometry for specific combinations of incident light wavelength and polarization as well as different gratings materials is crucial to fabricating ideal grating devices for light enhancement applications. Geometric parametric studies have been conducted, but substrate effects have not yet been thoroughly investigated. This work calculates the effect of varying SiO2 thickness on a Si substrate containing a nanogap dual-width Au plasmonic grating with a Ti adhesion layer, as has been shown possible to fabricate in previous work. Computational results will potentially be confirmed with experimental measurements such as surface-enhanced Raman spectroscopy, dark field scattering spectroscopy, or cathodoluminescence.

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