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Computational Electromagnetic Modeling of Optical Responses in Plasmonically Enhanced Nanoscale Devices Fabricated with Nanomasking Technique ERIC NOVAK, Shippensburg University, DESALEGN DEBU, CAMERON SAYLOR, JOSEPH HERZOG, University of Arkansas — This work computationally explores plasmonic nanoscale devices fabricated with a recently developed nanomasking technique that is based on the self-aligned process. Computational electromagnetic modeling has determined enhancement factors and the plasmonic and optical properties of these structures. The nanomasking technique is a new process that is employed to overcome the resolution limits of traditional electron beam lithography and can also be used to increase resolution in photolithography fabrication as well. This technique can consistently produce accurate features with nanostructures and gaps smaller than 10 nm. These smaller dimensions can allow for increased and more localized plasmonically enhanced electric fields. These unique metal devices encompass tunable, enhanced plasmonic and optical properties that can be useful in a wide range of applications. Finite element methods are used to approximate the electromagnetic responses, giving the ability to alter the designs and dimensions in order to optimize the enhancement. Ultimately, we will fabricate devices and characterize the plasmonic properties with optical techniques, including dark-field spectroscopy, to confirm the properties with the goal of generating more efficient devices.

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