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Enhancement of Second Harmonic Generation by Localized Surface Resonance Plasmons ALEXANDER ALLEN, North Carolina School of Science and Mathematics, ANDREW TRAVERSO, Center for Metamaterials and Integrated Plasmonics, Duke University, JONATHAN BENNETT, North Carolina School of Science and Mathematics, MAIKEN MIKKELSEN, Center for Metamaterials and Integrated Plasmonics, Duke University — We introduce an improved method of manufacturing materials that produce large enhancements of second harmonic generation. This is a step towards achieving nanoscale optical switching for applications in computing and telecommunications. To do this we use a combination of ionically self-assembled monolayers (ISAM) and silver nanocubes atop a gold substrate. Within the ISAM layers, a compound with a high second-order electric susceptibility value is used to generate the second harmonic frequency. The silver nanocubes enhance the pump wavelength by forming localized surface resonance plasmons between themselves and the surface of the substrate. The plasmonic enhancement of the incident wave allows it to maximally generate second harmonic light waves possible from the pump wave. This configuration is tunable to resonate with incident light over a wide range of wavelengths. Our results show definitive production of strong second harmonic waves from our assembly. We will discuss example data comparing our assembly to traditionally used nonlinear crystals such as KDP, and similar previous attempts at second harmonic generation.

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