

Abstract Submitted
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Optical and electronic properties of self-assembled nanoparticle-ligand metasurfaces¹ JAKE FONTANA, Naval Research Laboratory, JOHN LIVENERE, Norfolk State University, JOSHUA CALDWELL, CHRISTOPHER SPILLMANN, JAWAD NACIRI, RONALD RENDELL, BANAHALLI RATNA, Naval Research Laboratory — The optical and electronic properties of inorganic nanoparticles organized into two-dimensional lattices sensitively depend on the properties of the organic ligand shell coating the nanoparticles. We study the optical and electronic properties of these two-dimensional metasurfaces consisting of gold nanoparticles functionalized with ligands and self-assembled into macroscopic monolayers on non-templated substrates. Using these metasurfaces we demonstrate an average surface-enhanced Raman scattering (SERS) enhancement factor on the order of 10^8 for benzenethiol ligands and study the mechanisms that influence the enhancement. These metasurfaces may provide a platform for the development of low-power, low-cost next-generation chem/bio-sensors and new insights into the organic-inorganic interface at the nanoscale.

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