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Three-Dimensional Plasmonic Nanoclusters[1] NICOLAS LARGE, ALEXANDER URBAN, Rice University, XIASHUANG SHEN, Nanyang Technology University, YUMIN WANG, Rice University, HONG WANG, Nanyang Technology University, MARK KNIGHT, PETER NORDLANDER, Rice University, HONGYU CHEN, Nanyang Technology University, NAOMI HALAS, Rice University — Recent developments in the control and manipulation of electromagnetic radiation allow for the emergence of new concepts, found only in artificially engineered nanoscale media. Assembling nanoparticles into well-defined structures is an important way to create and tailor the optical properties of materials. While displaying fascinating optical properties, nanostructures created by self-assembly or lithography have a major drawback; strong angular-dependent optical properties resulting from their two-dimensionality. Here, we present novel three-dimensional nanoclusters comprised of noble metal nanoparticles encapsulated in a polymer displaying interesting optical features in the visible (Fano resonances, optical isotropy,...). We investigate the nature of the optical properties and their dependence on cluster geometry. Such three-dimensional clusters show great promise as optical kernels for metafluids, imparting metamaterial optical properties into disordered media such as liquids, glasses, or plastics, free from the requirement of nanostructure orientation.

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