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Virus templated plasmonic nanoclusters with icosahedral symmetry via directed assembly BANAHALLI RATNA, JAKE FONTANA, WALTER DRESSICK, Naval Research Lab, JAMIE PHELPS, JOHN JOHNSON, The Scripps Research Institute, TRAVIAN SAMPSON[1], Naval Research Lab, RONALD RENDELL, Retired, CARISSA SOTO, Naval Research Lab — Controlling the spatial and orientational order of plasmonic nanoparticles may lead to structures with novel electromagnetic properties and applications such as sub-wavelength imaging and ultra-sensitive chemical sensors. Here we report the directed assembly of three-dimensional, icosahedral plasmonic nanoclusters with resonances at visible wavelengths [1]. We show using transmission electron microcopy and *in situ* dynamic light scattering the nanoclusters consist of twelve gold nanospheres attached to thiol groups at predefined locations on the surface of a genetically engineered cowpea mosaic virus with icosahedral symmetry. We measured the bulk absorbance from aqueous suspensions of nanoclusters and reproduced the major features of the spectrum using finite-element simulations. Furthermore, because the viruses are easily produced in gram quantities the directed assembly approach is capable of high-throughput, providing a strategy to realize large quantities for applications.

[1] J. Fontana, W. J. Dressick, J. Phelps, J. E. Johnson, R. W. Rendell, T. Sampson, B. R. Ratna and C. M. Soto, Small **10**, 3058 (2014)

[1]NRL summer intern under the HBCU/MI Summer Research Program.

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