Abstract Submitted
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Two-photon activation of photoactive ligands bound to gold surfaces BRENDEN A. MAGILL, XI GUO, ERICH M. SEE, ROBERTO L. REYES, RICHEY M. DAVIS, WEBSTER L. SANTOS, HANS D. ROBINSON, Virginia Tech — Photoactive crosslinkers are useful tools for optically driven assembly of nano-particles. We report on the use of ultra-short laser pulses to affect localized photoreactions in o-nitrobenzyl-based photoactive ligands bound to a gold surface with thiol groups. The reaction is activated through a combination of thermal activation and two-photon absorption, while at higher power densities, ligands can be ablated from the surface through breaking of the gold-thiol bond. We will present data on the interplay of these three effects as a function of laser power and exposure time, and demonstrate assembly of nanoparticles onto optically patterned surfaces. Finally, we will discuss how this effect could be used to create well-defined nanoparticle assemblies where great binding-site selectivity can be obtained through the combination of high electromagnetic intensity enhancements at plasmon hotspots and the nonlinear scaling of photoactivation efficiency in two-photon absorption processes. We acknowledge financial support from the National Science Foundation and the Institute for Critical Technology and Applied Science.

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