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Directed Self-assembly of Gold Nanoparticles using Chemically Patterned Templates[1] ROBERT NIDETZ, JINSANG KIM, University of Michigan — Templated assemblies of metallic nanoparticles are useful for sensors, medical diagnostics, catalysts, and optical devices. We controlled the loading density of gold nanoparticles on a chemical template by manipulating the dimensions of the chemical template. Electron beam lithography was used to fabricate the template on Si wafers, which was chemically patterned with functional silanes that form self-assembled monolayers. The lithographically patterned regions were given a positive charge via aminopropyldimethylethoxysilane, while the remainder of the substrate was made hydrophilic via dodecyltrimethoxysilane. The charge-charge interaction between the negatively charged gold nanoparticles and the positively charged chemical template cause the nanoparticles to self-assemble onto the template. By altering the diameter of the chemical template, it was possible to control the number of 40 nm diameter gold particles that self-assemble. We are currently expanding the directed assembly strategy to nanorods assembly. The developed templated assembly method will find various applications of nano-size objects.

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