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Nanopatterned poly(ethylene glycol) brushes: A route for highly tunable assembly of Au nanoparticles M. SERDAR ONSES, PAUL F. NEALEY, University of Wisconsin-Madison — Assembly of metallic nanoparticles (NPs) on surfaces offers many interesting opportunities for scientific studies as macroscopic properties of the assemblies depend on organization of the particles at the nanometer length scale. On the other hand, new/improved functionalities of the assemblies are promising in the potential technological applications such as chemical sensing and metamaterials. Chemical patterning of surfaces for directed assembly of ex-situ synthesized NPs is advantageous due to controllable substrate-particle interaction and applicability to a range of different size and type of particles. Here we present assembly of Au NPs (15-50 nm) on lithographically patterned poly(ethylene glycol) (PEG) brushes. The density of NPs on the patterns can be controlled with the molecular weight of PEG brush and the size of particles. The ability to pattern PEG brushes with high chemical contrast and resolution (sub 50 nm) with the interesting particle brush interaction provides routes for highly controllable assembly of NPs. For example, number of particles per spot can be precisely controlled with high yields (single 95% and dimer 70% for 30 nm Au NP) and NPs of two different sizes (heterostructures) can be assembled on patterned spots.

M. Serdar Onses
University of Wisconsin-Madison

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