Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Fabrication of large-area arrays of hybrid nanostructures on polymer-derived chemically patterned surfaces XIAOYING LIU, University of Chicago, Institute for Molecular Engineering, DHRITI NEPAL, SUSHMITA BISWAS, KYOUNGWEON PARK, RICHARD VAIA, Soft Materials Branch, Functional Materials Division, Air Force Research Laboratories, PAUL NEALEY, University of Chicago, Institute for Molecular Engineering, UNIVERSITY OF CHICAGO TEAM, AIR FORCE RESEARCH LABORATORIES COLLABORATION — The precise placement and assembly of nanoparticles (NPs) into large-area nanostructure arrays will allow for the design and implementation of advanced nanoscale devices for applications in fields such as quantum computing, optical sensing, superlenses, photocatalysis, photovoltaics, and non-linear optics. Our work is focused on using chemically nanopatterned surfaces to fabricate arrays of hybrid nanostructures with each component of the building block at well-defined positions. The precise chemical contrast patterns with densities and resolution of features created using standard tools of lithography, polymer self-assembly, and surface functionalization allow for control of position and interparticle spacing through selective surface-particle and particle-particle interactions. We have demonstrated the assembly of NPs, including metallic NPs and semiconductor quantum dots, into arrays of hybrid structures with various geometries, such as monomers, dimers, quatrefoils, stripes, and chains. We have developed protocols to fabricate NP arrays over a variety of substrates, which allows for the design and characterization of optical and electronic nanostructures and devices to meet the requirements of various technological applications.

Xiaoying Liu
University of Chicago, Institute for Molecular Engineering

Date submitted: 15 Nov 2013 Electronic form version 1.4