Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Janus Au Nanoparticle Patterning via Polymer Single Crystals
CHRISTOPHER LI, BING LI, Drexel University — Gold nanoparticles (AuNPs) possess remarkable electrical and optical properties coupled with good chemical stability. Thus, they have wide potential applications in fabrication of advanced optical and electronic devices. In order to efficiently transfer their outstanding properties from nano- to micro-scale, patterned AuNPs are desired. Here, we report a novel method using polymer single crystals as substrates to pattern AuNPs. By using thiol-terminated polyethylene oxide (HS-PEO) as the substrate, we were able to assemble AuNPs into different patterns on the PEO single crystals. Furthermore, these AuNPs are asymmetrically functionalized (Janus NPs). A variety of shapes including chains and sheets were formed, and the size and areal density of the AuNP assemblies can be controlled through the AuNP adding time and the ratio between AuNPs and polymer single crystals, respectively. Because of the asymmetrical nature of the AuNPs, the resultant chains and sheets are both asymmetric (Janus chains and Janus sheets), which could lead to a variety of interesting optic properties. We anticipate that our approach would provide a facile means to pattern AuNPs, and it could be extended to other metal and semiconductor NPs.

Christopher Li
Drexel University

Date submitted: 30 Nov 2007 Electronic form version 1.4