Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Asymmetrical Functionalization of Nanoparticles Mediated by Polymer Single Crystals BING LI, CHRISTOPHER LI, Drexel University — Considerable attention has been paid to nanoparticle (NP) research because of their fascinating properties and potential applications in nanotechnology and biotechnology. Asymmetrically functionalizing NP is of particular interest because it could directly lead to controlled patterning of NPs into complex structures for a variety of applications. Herein we report using 2-dimensional thiol-terminated poly(ethylene oxide) (HS-PEO) lamellar single crystals to immobilize gold NPs (AuNPs). Furthermore, this unique technique also enables asymmetric functionalization of AuNPs. Free-standing bilayer AuNP/PEO films were obtained. Dissolving PEO single crystals led to free asymmetrically functionalized AuNPs and AuNP complexes. The degree of functionalization (number of polymer chains per particle) can be readily controlled by tuning the molecular weight. The low molecular weight PEO undergoes integral folding, which leads to the high areal density of thiol groups and thus the higher degree of functionalization, and vice versa. We anticipate that this methodology could be applied to other metal or semiconductor NPs.

Bing Li
Drexel University

Date submitted: 30 Nov 2007 Electronic form version 1.4