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Immobilizing Au Nanoparticles with Polymer Single Crystals, Patterning and Asymmetric Functionalization[1] BING LI, CHRISTOPHER LI, Drexel University — Considerable attention has been paid to nanoparticle (NP) research due to their fascinating properties and potential applications in nanotechnology and biotechnology. Asymmetrically functionalizing NP is of particular interest since it could directly lead to controlled patterning of NPs into complex structures for a variety of applications. Here we report, for the first time, using 2-dimensional polymer lamellar single crystals as the solid substrate to create patterned functional (thiol) surface and immobilize AuNPs. We demonstrated that patterning of AuNPs could be achieved and the AuNP area density could be easily controlled by polymer molecular weight. Furthermore, this unique technique also enables asymmetric functionalization of AuNPs. Bilayer AuNPs/polymer hybrids were obtained. Dissolving PEO single crystals led to free asymmetric binary AuNP complexes. This approach provides a novel means to pattern AuNPs and synthesize asymmetrically functionalized AuNPs. We also anticipate that this methodology could be applied to other metallic or semiconducting NPs.

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