

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Directed Hierarchical Assemblies of Nanoparticles in Thin Films¹

TING XU, UC, Berkeley — Controlling nanoparticle (NP) assemblies in thin films will enable one to capitalize on the unique properties of NPs so as to generate functional devices, such as hybrid photovoltaic, capacitors and optical devices. To this end, it is mandatory to control the macroscopic alignment of NP assemblies and inter-particle ordering with high precision to achieve a specific property. Recently, we described a new approach to assemble NPs over multiple length scales by combining small molecules with block copolymers (BCPs). Small molecules that favorably interact with NP ligands mediate polymer-NP interactions and solubilize the NPs within the BCP microdomains. The small molecules also direct the spatial distribution of NPs within the BCP microdomains with exquisite precision. In the bulk, NPs were shown to readily assemble into ordered 1-D, 2-D and 3-D arrays. I will discuss our recent studies on directed hierarchical assemblies of NPs in thin films. Specifically I will focus on how to manipulate the macroscopic alignment and long-range ordering of NPs and generating NP superlattice within the BCP microdomains.

¹Supported by NSF-DMR, ONR-YIP and DOE-BES

Ting Xu
UC, Berkeley

Date submitted: 22 Nov 2010

Electronic form version 1.4