

Cooperative Self -Assembly of Nanoparticles and Amphiphilic Polymers

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The ability to organize nanoparticles into desired assembly structure is important for both fundamental understanding of collective properties of nanoparticles and the fabrication of new materials and devices. Inspired by the way nature forms functional supramolecular assemblies using lipid bilayers as architectural skeletons, we utilize the self-assembly of amphiphilic polymers and nanoparticles to control the organization and properties of nanoparticles of various compositions. We have found that the incorporation of nanoparticles significantly affect the self-assembly of amphiphilic polymers, and the overall assembly structure and the arrangement of nanoparticles in polymer matrix can be controlled by manipulating the interactions between nanoparticles. Here, we will present what controls the solution phase binary self-assembly and how we use that knowledge to fabricate various types of well-defined hybrid assemblies.