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Kinetically Controlled Self-Assembly of Hierarchical Nanostructures Based on Block Copolymer Patchy Particles JEE YOUNG LEE, Univ of Delaware, KAREN WOOLEY, Texas AM University, DARRIN POCHAN , Univ of Delaware — Amphiphilic block copolymers have attracted much attention due to easily tunable morphologies from solution or melt assembly. In particular, they are able to self-organize into various nanostructures in solution based on solvent quality and block chemistry relative volume fraction. Recently, groups have used kinetic pathway to form kinetically trapped nanostructures far removed from classic micelle or membrane structure. Building on our previous studies on kinetically trapped patched micelles, we have further tailored the assembly by introducing functionalized nanoparticles to the system. Specifically, we take advantage of click-like ligation chemistry that allows rapid site-specific covalent attachment of partially functionalized patchy micelles to other polymer or inorganic nanoparticles. These patchy micelles, metastable structures with final morphologies that are highly dependent on assembly pathways, allow us to explore variety of kinetically trapped nanostructures and to use these as building blocks. We control the kinetic pathway by adjusting solvent conditions with time as well as by complexing hydrophilic, polyacid blocks of the polymer with organic amines. Cryogenic TEM is used to monitor structure formation in situ.

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