

研究主論文抄録

論文題目 Higher-Order Architectures Produced from Controlled Polymer Structures
(精密制御された高分子構造から生み出される高次構造)

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主論文要旨

Self-assembly of molecular building blocks is one of the most promising topics in material science. In nanoscience and nanotechnology, the self-assembly of synthetic preformed molecules plays an essential role. The main advantage of such 'bottom-up' approach is that materials can be pre-designed at molecular level to self-assemble, and form specific structures at nanoscale. However, the self-assembly of polymers is still a relatively new topic and it is an essential challenge of polymer science. The progress of control radical polymerization allows us to synthesize pre-designed polymers with unique structures, such as block copolymers and branched polymers. In addition, "click chemistry" also extends the possibility of structural design of the polymers by modification.

This thesis describes varieties of novel higher order hybrid polymer architectures consisted of well-designed polymers. The carefully designed branched, blocked and/or functionalized polymers were generally synthesized by controlled radical polymerization. The structure and function of higher order hybrid polymer architectures produced by self-assembly in solution or cross-linking based on click reaction were investigated in order to elucidate the correlation between design of polymer itself and higher order structure.