

Abstract Submitted
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Assembly of Block Copolymer-Nanoparticles Conjugates Towards Sub-10-nm Hybrid Ordered Nanostructures ZHIWEI LIN, PENGTAO LU, CHIH-HAO HSU, STEPHEN CHENG, Univ of Akron — Precisely controlled locations of nanoparticles (NPs) in block copolymers (BCP) and design of BCP/NPs hybrid nanostructures have attracted numerous research interests over the past several decades. In this work, two series of BC-NP conjugates, composed of a hydrophilic fullerene (AC_{60}) NP tethered with a polystyrene-block-poly(ethylene oxide) (PS-*b*-PEO) at the PS chain end (AC_{60} -PS-PEO) or the junction point (PS- AC_{60} -PEO), were utilized to investigate assemblies of these two series conjugates in the bulk. It was revealed that the incorporation of AC_{60} NPs induces the nano-phase separation of intrinsically disordered PS-*b*-PEO with low molecular masses. A variety of ordered nanostructures were found including lamellae, double gyroids and cylinders with domain sizes smaller than 10 nm. The different architectures of these conjugates provided evidence of how the NPs are located and distributed within the nano-phase separated structures, and in turn, demonstrated significant effects of these NPs on the stabilization of these originally unstable structures.

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