Abstract Submitted
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Adjustable bridge blocks make huge difference to the self-assembly of multiblock copolymers[1] WEIHUA LI, Department of Macromolecular Science, Fudan University — We present theoretical studies on two types of multiblock copolymers, whose self-assemblies lead to a lot of novel ordered nanostructures. The first example is BABCB multiblock terpolymer, where A- and C-blocks separately aggregate into isolated domains and the three B-blocks with adjustable lengths form the matrix. As a result, the middle B-block forms a natural bridge connecting A- and C-domains. In contrast to ABC, the BABCB can form many binary spherical and cylindrical phases with tunable coordination numbers. In addition, the ABCB solution can form a lot of planet-satellite micellar superstructures with tunable number of satellites that varies from 3 to 20. The another system is AB-type multiblock copolymers. In contrast to the above system, there is no natural bridge. Accordingly, we introduce multiple arms into the architecture which tend to partition themselves into different domains to maximize their configurational entropy, thus forming effective bridges. Furthermore, each arm is devised as BAB triblock to enable adjustable length of bridges. With this copolymer, we predict a few non-classical ordered phases, including a square array cylinder. Our study opens the possibilities of fabricating desired nanostructures using designed block copolymers.

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