

Abstract Submitted
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Kinetic control of block copolymer self-assembly into multicompartment and novel geometry nanoparticles¹ YINGCHAO CHEN, University of Delaware, XIAOJUN WANG, University of Tennessee, KE ZHANG, Northwestern University, KAREN WOOLEY, Texas A&M University, JIMMY MAYS, University of Tennessee, VIRGIL PERCEC, University of Pennsylvania, DARRIN POCHAN, University of Delaware, UNIVERSITY OF DELAWARE COLLABORATION, TEXAS A&M UNIVERSITY COLLABORATION, UNIVERSITY OF TENNESSEE COLLABORATION, UNIVERSITY OF PENNSYLVANIA COLLABORATION — Micelles with the segregation of hydrophobic blocks trapped in the same nanoparticle core have been produced through co-self-assembly of two block copolymers in THF/water dilute solution. The dissolution of two block copolymer sharing the same polyacrylic acid PAA blocks in THF undergoes consequent aggregation and phase separation through either slow water titration or quick water addition that triggers the micellar formation. The combination and comparison of the two water addition kinetic pathways are the keys of forming multicompartment structures at high water content. Importantly, the addition of organic diamine provides for acid-base complexation with the PAA side chains which, in turn, plays the key role of trapping unlike hydrophobic blocks from different block copolymers into one nanoparticle core. The kinetic control of solution assembly can be applied to other molecular systems such as dendrimers as well as other block copolymer molecules. Transmission electron microscopy, cryogenic transmission electron microscopy, light scattering have been applied to characterize the micelle structures.

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