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Kinetic control of block copolymer self-assembly into novel multicompartment and multigeometry nanoparticles[1] YINGCHAO CHEN, University of Delaware, SHIYI ZHANG, ANG LI, University of Texas A&M, XIAOJUN WANG, University of Tennessee, JIAHUA ZHU, University of Delaware, KAREN WOOLEY, University of Texas A&M, JIMMY MAYS, University of Tennessee, DARRIN POCHAN, University of Delaware, UNIVERSITY OF DELAWARE TEAM, UNIVERSITY OF TEXAS A&M COLLABORATION, UNIVERSITY OF TENNESSEE COLLABORATION — Nanoparticles with the phase separation of unlike hydrophobic blocks trapped in the same core have been produced via blending of two block copolymers in THF/water dilute solution. The dissolution of two amphiphilic block copolymer sharing the same polyacrylic acid PAA block and different hydrophobic block in pure THF undergoes consequent aggregation and phase separation via different kinetic control pathways. Importantly, the polymer is complexed with diamine molecules prior to either slow titration or fast addition of selective solvent which is the key of forming controlled micelle structure. Vesicle-cylinder, nested vesicle MCM and MGM nanoparticles were assembled and characterized via cryogenic TEM and selective staining methods. Small Angle X-ray scattering is applied to track the early-stage phase separation behavior which determines the final MCM/MGM nanoparticle formation.

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