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Multicompartment Micelles from pH Responsive Block Terpolymers[1] CHUN LIU, MARC HILLMYER, TIMOTHY LODGE, University of Minnesota — The self-assembly of multiblock copolymers into multicompartment micelles whose cores are subdivided into distinct subdomains is an exciting area of polymer science due to potential applications, foremost of which is in advanced drug delivery. Herein, we describe the synthesis of a series SODA block terpolymers (S: poly(styrene); O: poly(ethylene oxide); DA: poly[2-(dimethylamino)ethyl acrylate]) with varied architectures (miktoarm u-SODA and linear SODA and OSDA terpolymers). DA is a weak polybase that is hydrophilic at low pH and hydrophobic at high pH. It is also immiscible with the S block, a feature desirable for the formation of multicompartment micelles. As pH increases from 2.6 to 9.0, u-SODA micelles in water evolve from mixed corona (O + DA corona) spherical micelles to multicompartment (S + DA core) wormlike and spherical micelles. A similar evolution is also observed for linear OSDA and SODA terpolymers, except that some SODA multicompartment micelles are cross-linked together by sharing the middle O block. This type of pH-triggered evolution could be useful for sequential drug release.

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