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Rapid and Quasi-reversible Poly(vinyl acetate-b-vinyl alcohol) Spherical Micelle Fusion Induced by Poly(ethylene oxide) in Water MAHESH MAHANTHAPPA, MILTON REPOLLET-PEDROSA, Univ of Wisconsin, Madison — Methods for triggering morphology changes in aqueous dispersions of amphiphilic block copolymers (ABCs) are crucial for their development as responsive fluids with properties that may be manipulated “on demand.” Numerous groups have reported methods for switching the morphologies of ABCs by the incorporation of thermal and photochemical switches, the addition of salts, and changes in pH. We report a new ABC system in which a dispersion of spherical micelles may be rapidly and quasi-reversibly transformed into a solution of worm-like micelles, upon the addition of a water-soluble homopolymer. More specifically, we demonstrate that the addition of varying amounts of poly(ethylene oxide) homopolymer to a dilute dispersion of poly(vinyl acetate-block-vinyl alcohol) spherical micelles results in either (1) their immediate precipitation, or (2) their rapid fusion into worm-like micelles. Dilution of the latter solution of worm-like micelles with pure water induces their reversion into spherical micelles. By evaluating the effects of PEO molecular weight and solution concentration on the micellar interconversion process, we propose two possible mechanisms for this unexpected morphological transformation.

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