Kinetic and Thermodynamic Perturbations to Structural Formation in Drug-Loaded Micelles

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We are interested in injectable therapies that solidify when heated to body temperature. So-called micellar gels formed from amphiphilic copolymers are often encased in drugs, antibiotics, or other therapeutics and positional control can be established by relying on the solidification of the amphiphilic vehicle as part of delivery. We have used rheology, Differential scanning calorimetry, and time-resolved small angle x-ray scattering to resolve the changes that arise in the structure as cold fluids and dispersions are heated passively as they would be in vivo. We are interested in how the drugs affect both the driving force for amphiphile structure formation and where the drugs are partitioned within the structure. Both of these perturbations can affect the efficacy of delivering therapeutics if we are affecting the driving force for micelle formation. We can present our efforts to affect the structure formation of two different drugs, methyl paraben and cisplatin with PEO-PPO-PEO-based copolymers.