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Dynamic Processes in Diblock Copolymer Micelles with a Semi-Crystalline Core AVANTIKA SINGH, MEGAN ROBERTSON, University of Houston — Amphiphilic diblock copolymers, which form micelle structures in selective solvents, offer a great advantage of tunability in physical characteristics as compared to low molecular weight surfactants. Their micelles in aqueous solvents have been a subject of great interest in drug delivery applications for their high loading capacity and targeted drug delivery. The aim of this work is to understand the dynamic processes underlying the self-assembly of diblock copolymer micelle systems which have a semi-crystalline core. The present work focuses on amphiphilic diblock copolymers containing blocks of poly(ethylene oxide) (a hydrophilic polymer) and polycaprolactone (a hydrophobic polymer), which spontaneously self-assemble into spherical micelles in water. Polycaprolactone is a semi-crystalline polymer. A variety of experimental techniques are used to probe the kinetic processes occurring during micelle self-assembly, including time-resolved neutron scattering, dynamic light scattering, pulsed field gradient nuclear magnetic resonance, and fluorescence resonance energy transfer experiments.

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