Molecular Transportation of Block Copolymer in Electrostatic Associative Systems

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Micelles and hydrogels obtained from electrostatically associative interactions have been widely investigated as the delivery vehicles of biological molecules and pharmaceutically active compounds because of excellent stimuli-responsiveness and hydrophilic interior. However, much less is known about the dynamics of molecular partitioning in the self-assembled structures, particularly molecular exchange aspects, but this is the fundamental process to understand stimuli-responsiveness, structural stability and release of loading materials. In this study, molecular exchange dynamics of block copolymers in electrostatically associating micelles and hydrogels are documented using model block copolyelectrolyte system. These results provide key parameters to regulate the exchange dynamics and further insights to harness macroscopic changes of structural and mechanical properties in the electrostatically driven systems.