Micellization behavior of A-b-(B-alt-C)$_n$ multiblock terpolymers in a selective solvent for one terminal A-block

YU-CHIEH HSU, CHING-I HUANG, Institute of Polymer Science and Engineering, National Taiwan University, Taiwan, WEIHUA LI, FENG QIU, Department of Macromolecular Science, Fudan University, China, AN-CHANG SHI, Department of Physics and Astronomy, McMaster University, Canada — We used self-consistent field theory to investigate the micellization behavior of A-b-(B-alt-C)$_n$ multiblock terpolymers in the presence of a solvent that is selective to the terminal A-block. In particular, we focused on the effects of $\chi_{BC}$, and $f_A$, on the formation of micelles from ABC triblock and A(BC)$_3$ multiblock terpolymers, respectively. We observed a general trend that a segmented packing of B- and C-layers along the axial direction of the micelles is favored than the coaxial packing with the increasing of $\chi_{BC}$ or decreasing of $f_A$.

The separation of B and C blocks within a micelle leads to the formation of a variety of multicompartiment micelle morphologies, such as core-shell-cobra spherical micelles, hamburgers, and bump-surface micelles, in the ABC triblock copolymers. In the A(BC)$_3$ multiblock terpolymers, we discovered more fascinating micelles by implementing the SCFT simulation than by the DPD simulation. Besides the BC-segmented worm-like micelles, which have been found in the DPD simulation work, concentric multilayer spheres and vesicles can be formed by the solvent-induced effect when the solvophilic A-block is a majority component.