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Effects of co-Polymer Structured Architecture on Solution Assembly[1] ANURADHI WICKRAMASINGHE, MANJULA SENANAYAKE, SIDATH WIJESINGHE, SUPUN S MOHOTTALALAGE, DIPAK ARYAL, DVORA PERAHIA, Clemson University, LILIN HE, Oak Ridge National Laboratory, GARY S GREST, Sandia National Laboratories — Diblock copolymers assemble into a rich variety of micelles whose shape is governed by the degree of incompatibility of the blocks and their interactions with the solvents. Tethering multiple blocks into structured architectures enhances the span of interactions that control assembly. Here we probed the assembly of a 1Wt% A-B-C-B-A architecture, co-polymer of 100,000 gr/mol (C is polystyrene [PS], B is hydrogenated polyisoprene [PI] and A is poly (t-butyl styrene) in solutions using SANS. In cyclohexane though PS-PI forms star-like micelles, the pentablock associates into fractal aggregates. Increasing solvent polarity, by addition of propanol, drives the formation of elongated core-shell micelles with the PS blocks in the core and PI blocks reside in a highly swollen corona. The structured architecture enhances entropy resulting in less defined shapes that are maintained over a broad temperature range.

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