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Structure and Self-Assembly of Oligocarbonate-Fluorene End Functionalized Poly (ethylene glycol) ABA Triblock Polymer GUANGMIN WEI, VIVEK PRABHU, National Institute of Standards and Technology, SHRINIVAS VENKATARAMAN, YI YAN YANG, Institute of Bioengineering and Nanotechnology, The Nanos, Singapore, JAMES HEDRICK, IBM Almaden Research Center, California USA, VIVEK PRABHU TEAM, SHRINIVAS VENKATARAMAN, YI YAN YANG COLLABORATION, JAMES HEDRICK COLLABORATION — Hierarchical structures of oligocarbonate-fluorene end-functionalized poly(ethylene glycol) triblock copolymer (P(F-TMC)m-PEG444-P(F-TMC)m) were characterized by light scattering, atomic force microscopy, and Ultraviolet-visible spectroscopy in dilute regime in water, a poor solvent of F-TMC block. The evidence for pai-pai stacked of F-TMC block in self-assembled structure was provided. The self-assembly behavior is highly dependent on concentration and F-TMC block length, m. The presence of clusters dominates the population of scatterers once m is larger than 2, where there is no clear evidence of a separation of micelles and clusters. The molecular aggregation driven by F-TMC groups appears too strong to permit labile micelle-cluster dynamics as observed with m = 2 and 1.2. The non-mean field scaling of the aggregation number, when compared to models for triblock copolymers, highlights the need for a molecular-based model to predict the self-assembly at low end-group numbers. In our case, the end-groups are oligomers, so the comparison to Flory scaling may not be justified.

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