

Abstract Submitted
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Molecular Architecture Induced Chain-Folding in Polymeric Amphiphilic Unimolecular Micelles¹ LEI ZHU, JIANJUN MIAO, Polymer Program, Institute of Materials Science and Department of Chemical Engineering, The University of Connecticut, Storrs, CT 06269, GUOQIANG XU, Baker Laboratory of Chemistry and Chemical Biology, Cornell University, Ithaca, NY 14853, LU TIAN, KATHRYN UHRICH, Department of Chemistry and Chemical Biology, Rutgers University, Piscataway, NJ 08854, CARLOS AVILA-ORTA, BENJAMIN HSIAO, Chemistry Department, State University of New York at Stony Brook, Stony Brook, NY 11794 — An amphiphilic star-like macromolecule (ASM) with an aliphatic core and four poly(ethylene oxide) (PEO) arms was synthesized. Its crystallization and self-assembly behaviors at different crystallization temperatures (T_c s) were characterized by synchrotron small angle X-ray scattering (SAXS). The overall d -spacing of alternating amorphous and crystalline lamellae almost doubled from 11.4 nm for samples quenched into liquid nitrogen to 21.0 nm for $T_c = 42$ °C. Due to an insufficient arm-to-core ratio in the ASM, chain-folding was forced to occur in the arm PEO crystals, while only extended chain crystals were observed for the PEO oligomer having a molecular weight of 2000 g/mol. In the ASM, gradual transitions from almost once-folded to non-integer folded, and finally to extended chain crystals were observed with increasing T_c from -20 °C to 42 °C.

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