

Gaining independent control over molecular structure and morphology with ring opening polymerization-induced crystallization-driven self-assembly.

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Polymerization-induced self-assembly is a method for synthesizing anisotropic hierarchical structures. The rate of self-assembly of amphiphilic block copolymers can be controlled by manipulating the rate of polymerization. This is vital for predicting the morphological outcomes of structures formed, as well as improving reproducibility and scale-up. The rate of polymerization can be altered by changing the co-catalyst used in the ring-opening-polymerization of poly(ethylene glycol)-block-poly(L-lactide) block copolymers. The kinetics of the polymerizations are tracked using <sup>1</sup>H nuclear magnetic resonance (NMR) spectroscopy throughout the reaction until the full conversion has been reached. Characterization of subsequent organogels formed is studied through rheology. In this one-pot synthesis, preliminary results have shown that slower rates of polymerization induced by a (-)-Sparteine co-catalyst result in organogel formation while fast rates of polymerization induced by 1,8-Diazabicyclo[5.4.0]undec-7-ene (DBU) do not.

