



Yale Institute for Nanoscience and Quantum Engineering

Friday-April 14, 2017

12:00-1:00 PM

BECTON SEMINAR ROOM

Light lunch will be served at 11:45 a.m.

Professor Mingjiang Zhong

Chemical and Environmental Engineering, Yale University

Rational Design of Branched Macromolecules for Emerging Applications

Block copolymers can undergo an enthalpically-driven phase separation process to form nanostructures of diverse morphologies. Potential applications of phase-separated block copolymers in electronics and photonics have been demonstrated for decades. However, narrow tuning window for the length scale of microphases and poor control over nanostructure orientation make the improvement and industrialization of these materials still rather challenging. Recent developments in living polymerization techniques enable the synthesis of well-defined block copolymers of desirable composition and complex architectures. In the first part of this lecture, I will report our recent progress on the controlled synthesis and characterization of branched tetrablock bottlebrush block copolymers. These novel bottlebrush copolymers, which contain quasi-alternating sidechains, resulted in interesting phase behavior that promises to address obstacles preventing practical applications. The concept of precision synthesis was then extended to more complicated branched macromolecular architectures such as polymer networks. Design, characterization, and applications (including self-healing materials, bio-lubricants, and redox-flow batteries) of branched polymers will be introduced in the second part of the seminar.

Professor Victor Batista

Department of Chemistry, Yale University

“TBA”

Host: Professor Eric Altman