

# Chem 654: Synthetic Chemistry of Macromolecules

Fall 2014

TuTh 9:30-10:45 a.m., Chemistry Rm. 8335

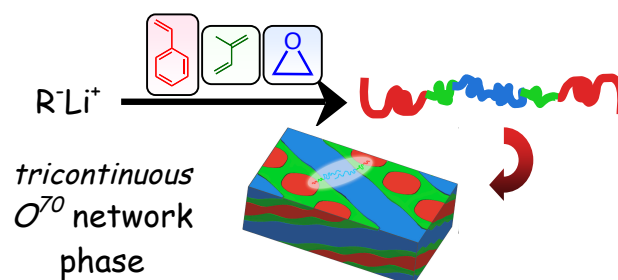
(2 or 3 credits, listed as "Materials Chemistry of Polymers")

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Rm. 7365  
262-0421

This course will introduce fundamental topics in synthetic polymer chemistry, with an emphasis on the underlying kinetics and mechanisms of these useful chemical reactions that enable control over various molecular parameters and bulk materials properties. Topics to be covered will include:

- Introduction to macromolecules
- Overview of physical characterization methods in polymer science (e.g., calorimetry, size exclusion chromatography, x-ray scattering, and rheology)
- Free radical polymerization
- Anionic and cationic polymerizations
- Metal-catalyzed coordination polymerization
- Condensation and ring-opening polymerizations
- Living polymerization techniques
- Basic theory, design, and applications of these synthetic advances to block copolymers



Through a combination of lectures, readings, and discussions of the primary literature, and various writing assignments, this class aims to acquaint students with the frontiers in synthetic polymer chemistry and their relevance in new materials design and applications.

Particular emphasis will be placed on *critical reading* of the primary literature, problems sets focused on practical polymer chemistry, with one midterm exam and one final exam (2-credit option). For the 3-credit option, students will develop original ideas in polymer science into a peer-reviewed research proposal.

**Textbook:** *Polymer Chemistry* by P. C. Hiemenz and T. P. Lodge. Boca Raton: RCR Press (Taylor and Francis), 2007. (The course will focus on Chapters 1-6).

