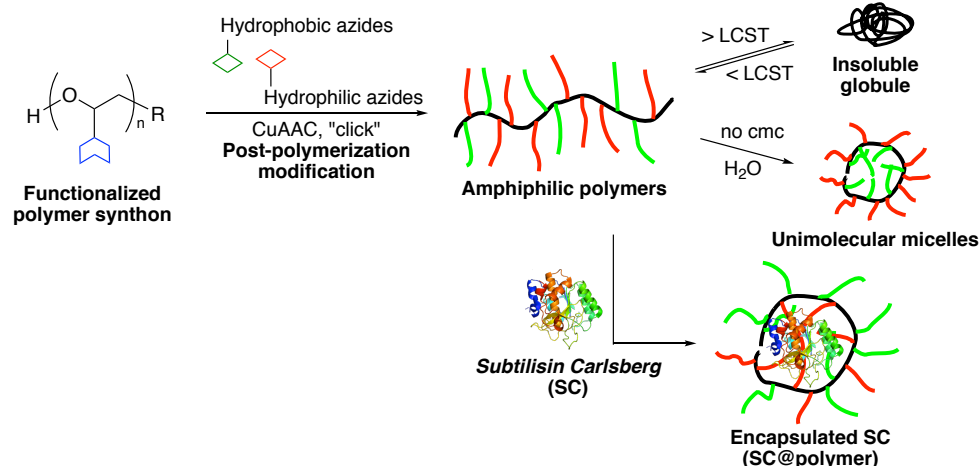


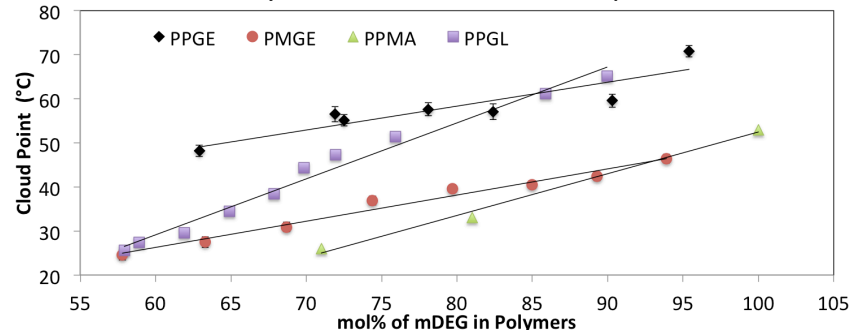
Smith Lab REU Project: Research Toward Sustainable Enzymatic Catalysis



Unimolecular micelles are little explored amphiphilic materials containing hydrophobic and hydrophilic groups in the same molecule. Typical micelles self-assemble from several molecules.



Tunable LCST. Solubility decreases while the temperature increases

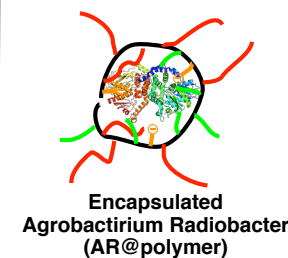
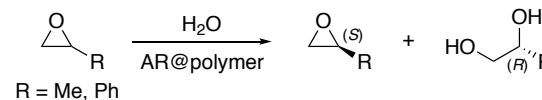


Students will learn:

- Monomer and polymer synthesis
- Post-polymerization modification

We have shown that amphiphilic polymers do not aggregate, which allows the size of unimolecular micelles to be controlled by the molecular weight of the polymer. Our goals include (i) synthesizing amphiphilic polymers and studying how their backbone and sidechain compositions affect polymer properties, and (ii) assessing their ability to stabilize enzymes ex vivo.

Enzymes are remarkable catalysts. Unimolecular micelles could stabilize enzymes ex vivo for catalyzing reactions where reactants and/or products are not biocompatible (e.g. the enzymatic epoxide resolution below).



Success on this front would be an important step forward in sustainable catalysis.

- Purification techniques
- Polymer characterization
- Enzymatic catalysis