Group : Dynamic Polymers
Project : **Bio-based Vinylogous PU-based Dynamic Covalent Chemistry**
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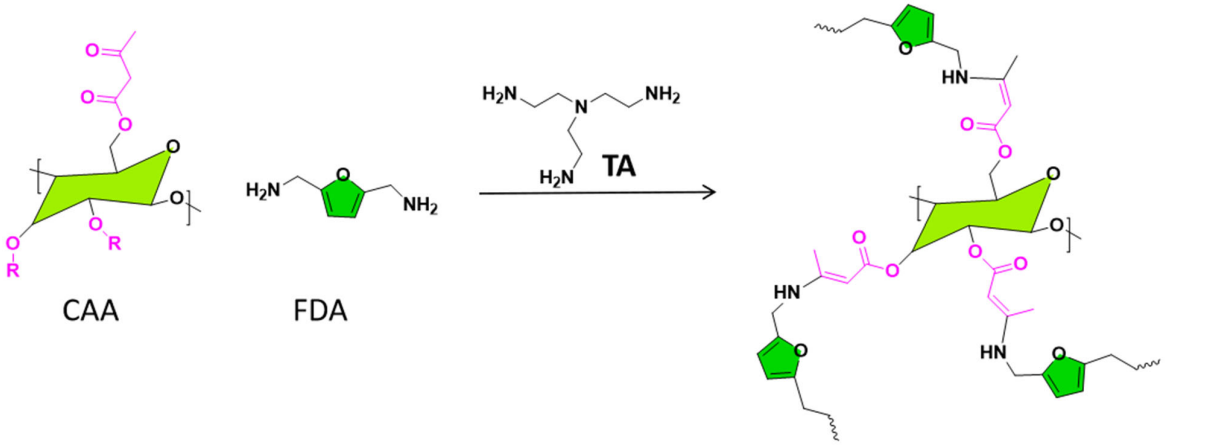
Introduction

Although conventional thermosets have superior mechanical and thermal stability, they have limited recyclability due to permanent crosslinking. As a result, the production and use of conventional is non-circular with an associated environmental impact. Since, early 2000, material chemists brought some unique strategies to replace the permanent crosslinking networks with dynamic covalent bonding to realize a recyclable thermoset. These dynamic networks mostly behave as either dissociative or associate networks under stimuli (pH, heat, UV). Associate exchange become more popular and reported among scientists due to the constant crosslinking density at reprocessing temperature. Vinylogous polyurethane (PU) is one of the interesting associative dynamic chemistry due to its catalyst-free system and maintains similar mechanical properties. Here, we propose the biobased monomers cellulose tri acetoacetate (CAA), furfuryl diamine (FDA) and tris-amine (TA) will lead to form a crosslinked vinylogous PU vitrimer networks which will be shown to be self-healing, reshapable with great chemical and thermal stability.



Research Objectives

- Synthesis, and modification of monomers for the preparation of vinylogous PU.
- Preparation and characterization of dynamic crosslinked vinylogous PU networks.
- Properties studied like self-healing, reprocessing, mechanical, and recyclability.

Characterization

In this project, several different characterization techniques (such as NMR, FTIR, GPC, DSC, rheology, etc.) will be used to prepare monomers and crosslinked materials.

More information

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