YOUNG MACROMOLECULAR RESEARCHER WEBINAR

Tue 2-April 2024 15:00-15:45 (UK)

Azalea Uva, University of Toronto

Designing Semiconducting Polymers using Carotenoids

Naturally occurring compounds, such as carotenoids, are excellent candidates to be incorporated into π-conjugated polymer systems due to their extended π-conjugation, leading to opportunities to create semiconducting polymers with site-specific degradable linkages for use in transient electronics. Herein, we present the use of carotenoid monomers in the synthesis of degradable π-conjugated polymers. To impart on-demand acid hydrolysis of this new class of conjugated polymers, imine bonds are introduced into the polymer backbone, leading to depolymerization within minutes. Additionally, sunlight-mediated oxidation is explored as an alternative degradation strategy due to the presence of carotenoid units. This presentation will primarily focus on the synthesis of this new class of polymers, as well as the degradation characterization.

Andrew King, University of North Carolina at Chapel Hill

Investigation of the Mechanism of Polymerization and Structure-Reactivity Relationships for Dinuclear Complexes in Conjugated Polymer Synthesis

Applications for conjugated polymers have historically been accelerated by cross-coupling – e.g. Kumada, Suzuki, Stille, and Negishi – polycondensation reactions, which granted access to a broader scope of conjugated polymer compositions. Of the available cross-couplings, Kumada cross-coupling is particularly appealing because it generally utilizes abundant first-row metals and generates an inert salt byproduct. The vast majority of Kumada cross-coupling polymerizations utilize mononuclear metal complexes, but these complexes have been shown to have limitations, such as a small monomer scope. Dinuclear analogs are an intriguing alternative to the mononuclear complexes, but much less is known about their fundamental reactivity. Thus, in this work we investigate structure-reactivity relationships for dinuclear nickel and iron complexes in conjugated polymer synthesis and demonstrate the ability of dinuclear complexes to access alternative mechanisms of polymerization.

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