**[Synthesis of degradable polymers via metathesis reaction of ruthenium fischer carbenes](https://acs.digitellinc.com/acs/live/22/page/677/3?eventSearchInput=&eventSearchDateTimeStart=&eventSearchDateTimeEnd=&eventSearchTrack%5b%5d=201" \l "sessionCollapse393946)**

[*Xuelin Sui*](https://acs.digitellinc.com/acs/live/22/page/677/3?eventSearchInput=&eventSearchDateTimeStart=&eventSearchDateTimeEnd=&eventSearchTrack%5b%5d=201) *and*[*Will Gutekunst*](https://acs.digitellinc.com/acs/live/22/page/677/3?eventSearchInput=&eventSearchDateTimeStart=&eventSearchDateTimeEnd=&eventSearchTrack%5b%5d=201)

*Georgia Institute of Technology*

Degradable polymers are an important field of research in polymer science and have been used in a wide range of applications including (nano)medicine, microelectronics, and environmental protection. As one of the most efficient methods to construct olefinic polymers, ring-opening metathesis polymerization (ROMP) can endow the obtained polymers with an impressive range of functionalities, but the materials are usually persistent in the environment due to the high stability of all carbon backbone. Ruthenium Fischer-type carbenes have usually been demonstrated as inactive species in metathesis reactions and are frequently regarded as inert species in ring-opening metathesis polymerization. In this presentation, these complexes play a crucial role in cascade alternating ring-opening metathesis polymerization targeting to generate degradable poly(enol ether)s. When enyne or acyclic diyne monomers are combined with low-strain cyclic enol ethers, a controlled chain-growth copolymerization occurs resulting in degradable polymers decorated by hydrolytically labile enol ether backbones with high degrees of alternation (>90% alternating dyads), low dispersities, and targetable molecular weights. Due to the controlled behavior, this methodology is amenable to the synthesis of alternating diblock polymers with combinations of enyne-enyne or diyne-enyne blocks. All the obtained polymers can be degraded into small-molecule fragments under aqueous acidic conditions. This work furthers the potential of Fischer-type ruthenium alkylidenes in polymerization strategies and presents new avenues for the generation of functional metathesis materials.

Diagram

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