Catalytic alternating living ring-opening metathesis polymerization

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The physical properties of a polymer are precisely related to its constituent monomer sequence. Nowadays the scalable and controllable synthesis of alternating polymers remains scarcely realized. To address this need, an enhanced version of alternating ring-opening metathesis polymerization (AROMP) has been elaborated. Herein, the AROMP process was made catalytic in a living fashion for alternating copolymers based on a 1,1-disubstituted cyclopropene monomer. This method is termed catalytic alternating living ring-opening metathesis polymerization (CAL-ROMP).

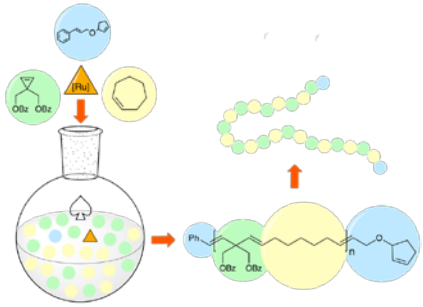

Figure 1.1: Catalytic alternating living ring-opening metathesis polymerization.

In CAL-ROMP, ring-strained olefins are polymerized by a transition-metalalkylidene in a catalytic alternating and living fashion. By introducing a chain-transfer agent (CTA) only catalytic quantities of the metal complex are necessary. Due to the low amounts of ruthenium catalyst needed, no work up is required. The use of a monomer designed to undergo alternating copolymerization fulfills the alternating aspect of this method. The living character of this approach imparts a degree of molecular weight control, low molecular weight dispersities ($Đ$) and access to block copolymers.

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