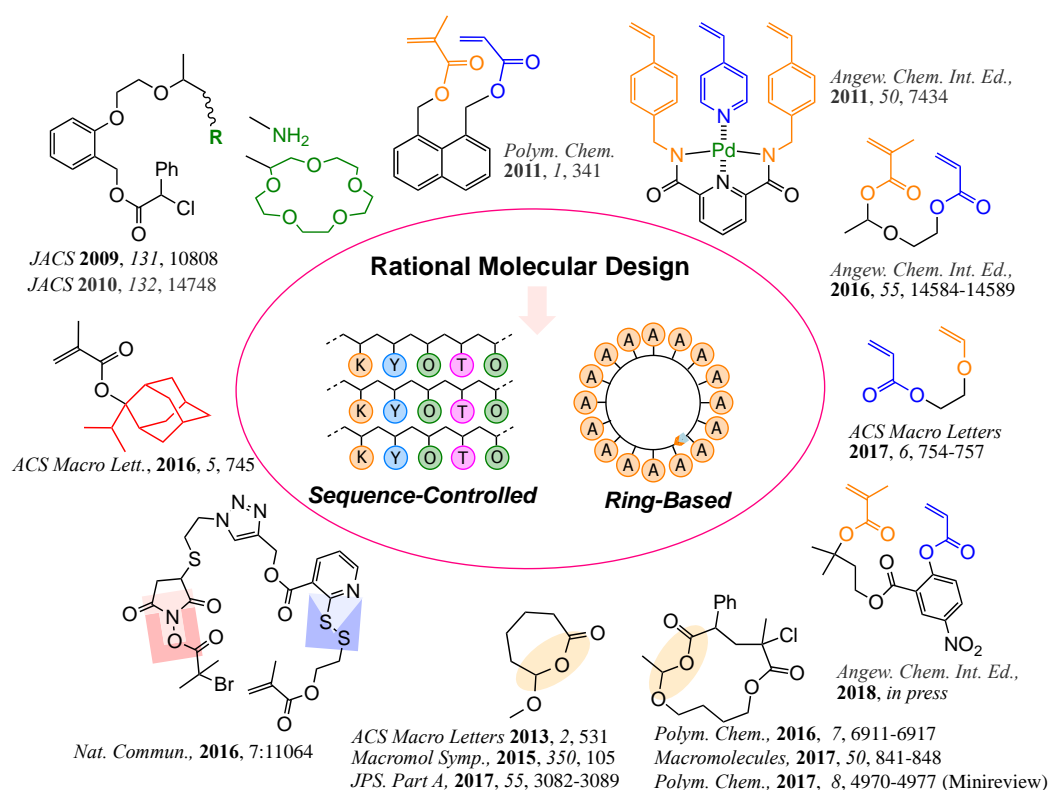


# Control of Sequence and Topology for Vinyl Polymers by Rational Molecular Design

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Biopolymers such as DNA and proteins are expressing their functions based on sequence and position of functional groups in the pendant as well as shape (topology) of the main chain. For synthetic polymers, development of living polymerization has allowed control of chain length (molecular weight) and terminal groups but control of topology and sequence is still challenging. Our efforts have been directed to control of side-chain sequence and main-chain topology for vinyl polymers via rational molecular design for initiators and monomers as follows: initiators having a recognition site for a special monomer, multi-vinyl monomers carrying cleavable spacers to control alternating copolymers; inimer to control iterative cyclization; bulky and cleavable monomers to control iterative radical addition; and hemiacetal ester-based cyclic initiators for ring-expansion polymerizations.



**Figure 1.** Rational Molecular Design for Initiator and Monomer in Living Polymerization for Control of Monomer Sequence and Cyclic Topology

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