Iron-catalyzed ring-opening metathesis polymerization of olefins

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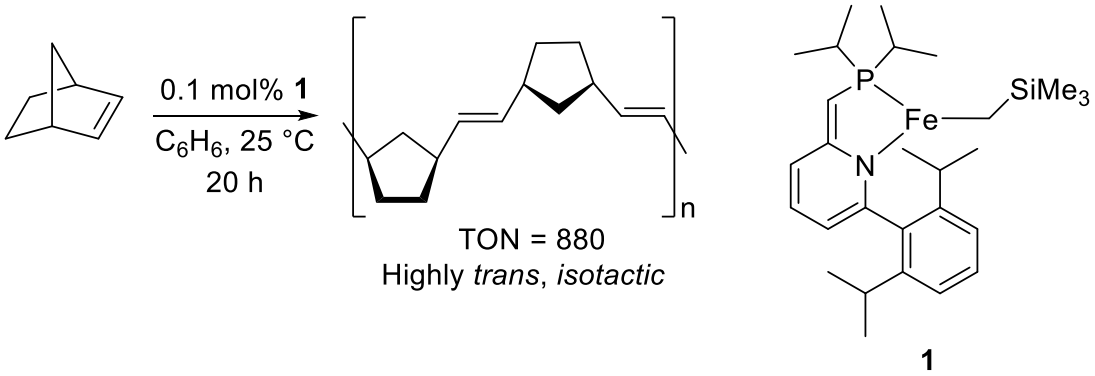
The olefin metathesis reaction is among the most widely applicable catalytic reactions for carbon-carbon double bond formation. Currently, Mo- and Ru-carbene catalysts are the most common choices for this reaction. It has been suggested that an iron-based catalyst would be a desirable economical and biocompatible substitute of the Ru-catalysts;[1] however, practical solutions in this regard are still lacking.[2] **Here, we report the discovery and mechanistic studies of three-coordinate iron (II) catalysts for ring opening metathesis polymerization (ROMP) of olefins.** Moreover, the iron catalysts enabled the formation of polynorbornene with stereoregularity and high molecular weight (>10^7 g/mol). The polymerization in the presence of styrene revealed cross metathesis reactivity with an iron catalyst. Mechanistic studies suggest the possible role of metal-ligand cooperation in formation of the productive catalyst. This work opens the door to the development of iron-complexes that can be economical and biocompatible catalysts for olefin metathesis reactions.[3]



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