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**Proximal effects in bimetallic catalysts for olefin polymerization, in cross metathesis of poly(3-R-cyclooctenes), and in multiblock polymers**

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**Tolerance and Incorporation of Amino Olefins by Dinickel Bisphenoxyiminato Polymerization Catalysts**

In coordination insertion polymerization, strong binding of polar moieties hinders polymerization. When polar groups are present, chain walking steps can halt or terminate polymerizations.

We designed bimetallic complexes that could differentiate between proximal and electronic effects.

**Dizirconium dif(amine bis(phenoolate)) Polymerization Catalysts for the Enhancement of Stereoregularity**

We designed early transition metal bimetallic complexes to see if the strategy we developed with bimetallic Ni complexes could extend to group 4 complexes known for higher activity and incorporation of comonomers.

**Regioselective Cross Metathesis for Block and Heteroterephaleic Polymer Synthesis**

Ring-opening metathesis polymerization (ROMP) of 3-substituted COE monomers (BRCOE) is regio- and stereoselective: head-to-tail and trans.

We studied cross metathesis (CM), a secondary reaction during ROMP that occurs between chains and found that it also happens with high head-to-tail and trans selectivity.

**Self Assembled Block Polymers: Morphology of Tri- and Triblock Terpolymers and Applications in Water Purification**

We examined triblock polymers with high incompatibility of covalently attached blocks to study the effects of frustration.

Theory suggests exciting possible morphologies for ABC4 tetrablock terpolymers with high internal incompatibility.

We are developing new robust block polymer-derived charge mosaic membranes that will significantly advance water desalination technology by providing higher salt selectivity and throughput.

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