Copolymerization of Epoxides with Comonomers: Catalyst and Material Designs

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The copolymerization of epoxides with comonomers is a promising strategy to prepare novel polymer materials. For example, the alternating copolymerization of epoxides with carbon dioxide (CO_2), which has been considered to be one of the most promising processes for CO_2 utilization, gives aliphatic polycarbonates. In addition, polyesters can be prepared via the alternating copolymerization with cyclic anhydrides (CAs). The latter copolymerization is a highly diverse synthetic method for polyesters since polymer architectures and properties can be easily controlled depending on a combination of the two monomers. For these copolymerizations, numerous efforts have been devoted to develop high performance metal catalysts.

In the present study, we focus on the development of new copolymerization catalysts based on dinuclear metal complexes. The complexes demonstrated higher catalytic activity than the corresponding mononuclear complexes via cooperative effect between two metal centers. The design and synthesis of novel polycarbonate- and polyester-based polymer materials will also be discussed.

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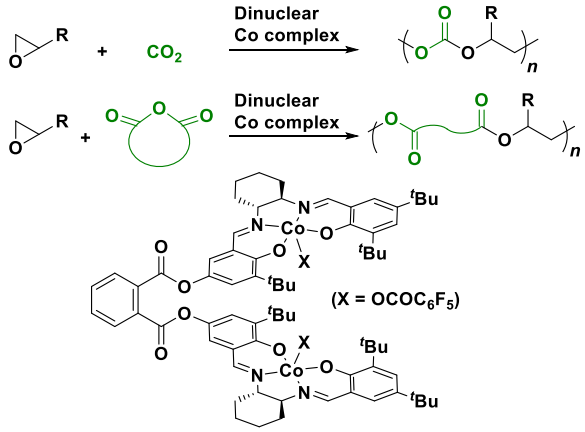

Copolymerizations of epoxides with CO_2 and cyclic anhydrides

Author Biography: *Dr. Koji Nakano received his Doctoral Degree of Engineering from Kyoto University under the guidance of Professor Tamejiro Hiyama in 2005. He started his academic career at the University of Tokyo (Professor Nozaki's group) in 2002 as research associate and assistant professor. In 2012, he moved to Tokyo University of A&T as senior assistant professor, and was promoted to associate professor in 2015. He developed a variety of catalysts for ring-opening polymerization of cyclic monomers and novel organic functional materials based on π-conjugated compounds. He received The Chemical Society of Japan Award for Young Chemists, and so on.*

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