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Table of Contents

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Model Devised for Polyolefin Catalysts

Producing polyolefins via Ziegler-Natta catalysts is one of the most fundamental industrial chemical processes. Piotr Sobota of the University of Wrocław, in Poland, and coworkers now have devised a model system that for the first time provides a clear picture of the active-site structure of an important commercial polyolefin catalyst (*Inorg. Chem.*, DOI: 10.1021/ic7013094). Polyolefin catalysts typically are formed from a precursor containing magnesium and titanium chlorides or alkoxides. For the catalyst studied, the precursor is $Mg_3Ti(OR)_8X_2$ (R = alkyl, X = o-cresol or OCH_2CH_3). But the exact structure of the active catalyst is unknown. The researchers instead created an isolable manganese mimic containing a Mn_3Ti unit and obtained its crystal structure. This model permitted them to visualize the polymerization process. They suggest that the metal atoms of the catalytic site, in which the titanium atom occupies a chiral position, impose a chiral orientation to the growing polymer chain. This effect guides the head-to-tail insertion of olefin units into the chain, which results in a stereoregular polymer.