Basic Understanding of Active Sites Transformations on Heterogeneous Olefin Polymerization Catalysts

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Heterogeneous olefin polymerization catalysts including Ziegler-Natta and Phillips catalysts have been playing the most important role in the industrial field. They have achieved the most fantastic success in the world with respect to their great contributions for synthesis of various polyolefin materials. In spite of several decades of research efforts since early 1950s, many aspects concerning the active sites and polymerization mechanism for both catalyst systems still remain ambiguous and controversial. In this work, the deactivation phenomenon of Ziegler-Natta catalysts for propylene polymerization and the induction period of Phillips catalyst for ethylene polymerization were studied to get novel aspects on active sites transformation. Our recent series of studies showed these phenomena are very much informative relating to various mechanistic aspects of both catalysts. Novel mechanisms with respect to the transformation of active sites will be discussed in detail in terms of better understanding of the heterogeneous olefin polymerization catalysis.