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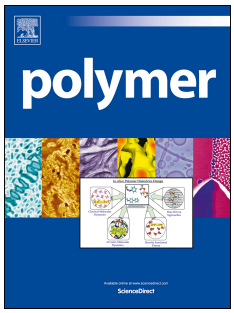

Trans-1,4- stereospecific polymerization of isoprene with $MgCl_2$-supported Ziegler-Natta catalyst I. Initial polymerization kinetic and polymerization mechanism

Xiangyu Liu, Weitian Li, Qingtao Niu, Riguo Wang, Aihua He

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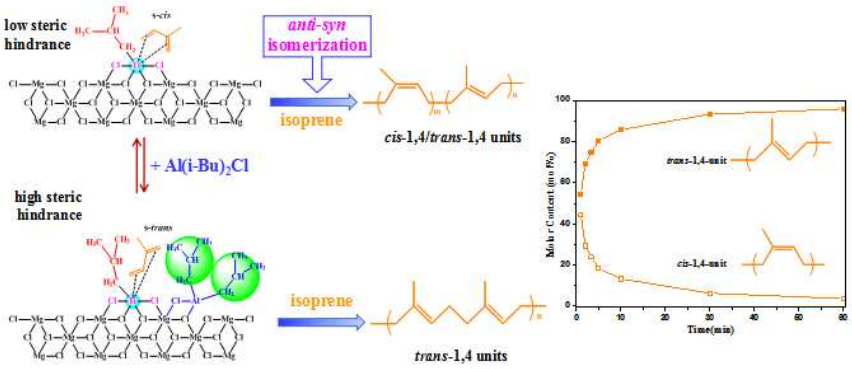
Xiangyu Liu, Weitian Li, Qingtao Niu, Riguo Wang, Aihua He



Scheme 1. Proposed active center sites and polymerization mechanism of isoprene in $TiCl_4/MgCl_2$ system.

Trans-1,4 stereospecific polymerization mechanism of isoprene with heterogeneous $TiCl_4/MgCl_2$-$Al(i\text{-}Bu)_3$ Ziegler-Natta catalyst was investigated for the first time. The active centers with low steric hindrance gave the mixed *cis*-1,4/*trans*-1,4 units due to reversible *anti-syn* isomerization, the active centers with high steric hindrance formed by adsorption of $Al(i\text{-}Bu)_2Cl$ on Mg adjacent to the center Ti gave the high *trans*-1,4 units. The *trans*-1,4-polyisoprenes gradually increased with the increase in polymerization time accompanying with the gradually transformation of species with low steric hindrance to species with high steric species in the initial polymerization stage.