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ETH transfer – Linking Science and Business

A simple catalyst enabling living polymerization of olefins at high temperatures

Keywords

Linear polyethylene, Narrow polydispersity, Controlled molecular weight, Room temperature, Metallocene

Patent Status

- Patent pending PCT

Features & Benefits

- Linear polyethylene
- Narrow polydispersity (PDI)
- No side chains
- Time dependent regulated PE chain length
- Process with cost effective cooling

Invention

This invention shows that a sterically hindered, activated metallocene catalyst leads to a nearly living polymerization process that occurs even at high temperatures (> 25°C) (Fig. 1). Activation of the catalyst with non-transfer agents (borane /borate) or even with MAO produces a polyethylene with a controlled molecular structure (fig. 2b), a narrow polydispersity (PDI) and a high linearity. No significant termination process occurs even at high temperatures (fig. 2a).

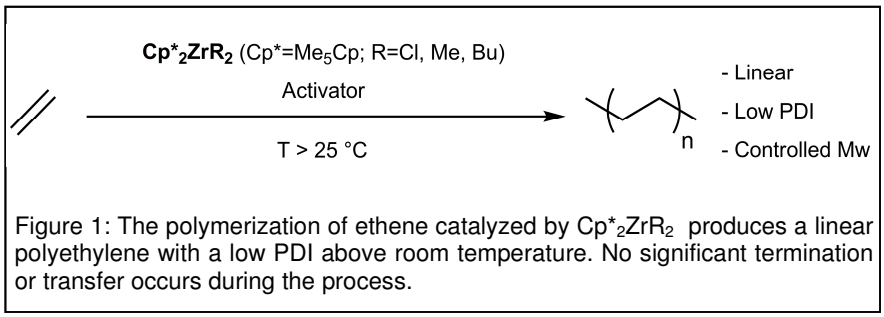

Figure 1: The polymerization of ethene catalyzed by $Cp^*_2ZrR_2$ produces a linear polyethylene with a low PDI above room temperature. No significant termination or transfer occurs during the process.

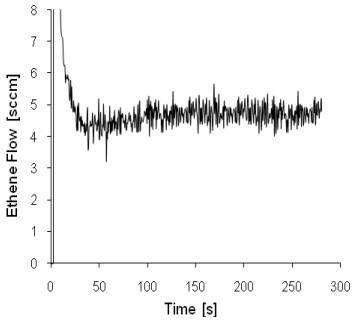

Figure 2a: The consumption of ethylene remains constant during the polymerization catalyzed by the activated metallocene $Cp^*_2ZrR_2$.

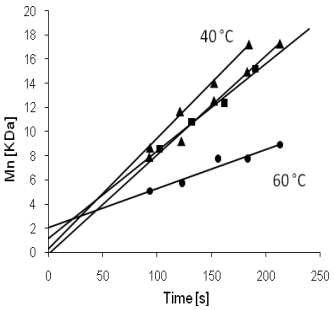

Figure 2b: GPC results exhibit a linear molecular weight (Mn) increase with time for the polyethylene produced with the activated metallocene $Cp^*_2ZrR_2$ catalyst at temperatures up to 60°C.

Field of Application

- Polyethylene industry
- Specialty chemical industries
- Typical products:
  Laser printer toner
  Hot adhesives
  Wax

References

- F. Di Lena, E. Quintanilla, P. Chen, Chem. Commun. (2005) 5757.
- Y. Zhang, R. J. Keaton, L. R. Sita, J. Am. Chem. Soc. (2003) 5757.
- S. J. Lancaster, M. Bochmann, J. Organomet. Chem. 654 (2002) 221.

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