Semi-Hydrogenated, Asymmetric Metallocene Catalysts for the Propylene Polymerization

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The hydrogenation of *rac*-[1-(9-η^5-fluorenyl)-2-(5,6-cylopenta-2-methyl-1-η^5-indenyl)ethane]metallocene dichlorides (**1a**: Zr, **1b**: Hf) with $PtO_2 \times H_2O/H_2$ is reported. The diastereoselective formation of exclusively *rac*-[1-(2,3,4,5,6,7,8,9-octahydro-η^5-fluorenyl)-2-(2-methyl-1,4,4a(*R*;*S*),5,6,7,7a(*S*;*R*),8-octahydro-s-η^5-indacenyl)ethane]metallocene dichlorides (**2a**: Zr, **2b**: Hf) was shown by ^{1}H-NMR and by X-ray analysis of **2a**. Both compounds were activated *in situ* with triisobutylaluminum/$PhC_3^+[B(C_6F_5)_4]^-$ and tested as catalysts in propylene polymerization reactions. Comparison to the non-hydrogenated complexes revealed a decrease in molecular weight of the polymer and in catalyst activity. Experiments at elevated temperatures resulted in a lower stereospecificity and reduced isotacticity values indicating a polymerization mechanism analogous to C_2-symmetric catalysts.

Key words: Metallocene Polymerization Catalyst, Polypropylene, Diastereoselective Hydrogenation