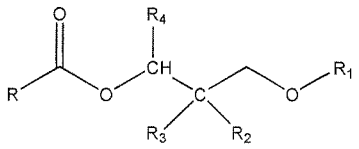
CLAIMS

1. A catalyst composition comprising:

a procatalyst composition comprising a combination of a benzoate-containing magnesium ~~moiety~~chloride, a titanium moiety, and greater than 6.5 wt % of an alkoxypropyl ester with the structure (I)

(I)



wherein R, R_1, R_2, R_3, and R_4 are the same or different, R is selected from the group consisting of an unsubstituted aliphatic C_3-C_{20} secondary alkyl group, a substituted aliphatic C_3-C_{20} secondary alkyl group, an unsubstituted C_2-C_{20} alkenyl group, and a substituted C_2-C_{20} alkenyl group;

R_1 is selected from the group consisting of an unsubstituted C_1-C_{20} primary alkyl group, a substituted C_1-C_{20} primary alkyl group, and a C_2-C_{20} alkenyl group;

each of R_2 - R_4 is selected from the group consisting of hydrogen, a C_1-C_{20} primary alkyl group, a substituted C_1-C_{20} primary alkyl group, a C_2-C_{20} alkenyl group, and combinations thereof;

a cocatalyst; and

an external electron donor.

2. The catalyst composition of claim 1 wherein at least one of R_2 - R_4 is hydrogen.

3. The catalyst composition of claim 1 wherein at least two of R_2 - R_4 are hydrogen.

4. The catalyst composition of claim 1 wherein any of R, R_1, R_2 R_3 and R_4 is a C_2-C_{20} alkene group with the structure (II)

(II)

$$C(H)=C(R_{11})(R_{12})$$

wherein R_{11} and R_{12} are the same or different, each of R_{11} and R_{12} is selected from the group consisting of hydrogen and a C_1-C_{18} hydrocarbyl group.

5. The catalyst composition of claim 1 comprising greater than 10 wt% of the alkoxypropyl ester.

6. A process comprising:

contacting a procatalyst precursor with a halogenating agent in the presence of ~~an~~ the alkoxypropyl ester of claim 1, the procatalyst precursor comprising a benzoate-containing magnesium chloride; and

forming a procatalyst composition comprising a magnesium moiety, a titanium moiety, and an internal electron donor comprising the alkoxypropyl ester.

7. The process of claim 6 comprising pre-halogenating the procatalyst precursor with the halogenating agent before the contacting.

8. The process of claim 6 comprising forming a procatalyst composition comprising greater than 6.5 wt % alkoxypropyl ester.

9. A polymerization process comprising:

contacting, under polymerization conditions, propylene and optionally one or more comonomers with ~~a~~ the catalyst composition of claim 1 comprising a procatalyst composition with greater than 6.5 wt % of an alkoxypropyl ester, a cocatalyst, and an external electron donor; and

forming a propylene-based polymer.

10. The process of claim 9 comprising forming a propylene-based polymer having a melt flow rate greater than 4 g/10 min.

11. A polymeric composition comprising:

a propylene-based polymer polymerized using the catalyst of claim 1 ~~comprising an alkoxypropyl ester~~ and having a melt flow rate greater than 4 g/10 min.

12. The polymeric composition of claim 11 wherein the propylene-based polymer has a polydispersity index from 3.5 to 6.0.

13. The polymeric composition of claim 11 comprising 3-methoxypropyl isobutyrate.