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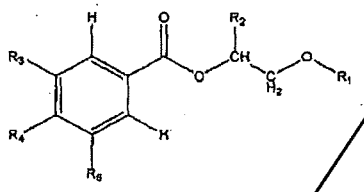
CLAIMS

1. A process comprising:

first contacting a procatalyst precursor with an aromatic alkoxyalkyl ester and a halogenating agent to form a procatalyst intermediate, the aromatic alkoxyalkyl ester having the structure (III)

(III)



wherein R_1 and R_2 are the same or different, R_1 is selected from the group consisting of a C_1-C_{20} primary alkyl group, a substituted C_1-C_{20} primary alkyl group, and a C_2-C_{20} alkene group;

R_2 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, and a C_2-C_{20} alkene group; and

R_3, R_4, R_5 are the same or different, each of R_3, R_4, R_5 is selected from the group consisting of a heteroatom, a C_1-C_{20} hydrocarbyl group, a substituted C_1-C_{20} hydrocarbyl group, and a C_1-C_{20} hydrocarbyloxy group;

second contacting the procatalyst intermediate with an alkoxyalkyl ester that is the same or different than the alkoxyalkyl ester in the first contacting, and a halogenating agent; and

forming a procatalyst composition comprising a combination of a magnesium moiety, a titanium moiety and greater than 10 wt % of the aromatic alkoxyalkyl ester.

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2. The process of claim 1 wherein the first contacting comprises adding a first aromatic alkoxyalkyl ester of structure (III) and a second alkoxyalkyl ester to the reaction mixture.

3. The process of claim 1 wherein the second contacting comprises adding a first aromatic alkoxyalkyl ester of structure (III) and a second alkoxyalkyl ester to the procatalyst intermediate.

4. The process of claim 1 wherein the first contacting occurs in a reaction mixture, the process comprising reacting the halogenating agent with the procatalyst precursor in a reaction mixture having a temperature from 30°C to 150°C; and

adding the aromatic alkoxyalkyl ester from greater than 0 minutes to about 30 minutes after the reacting.

5. The process of claim 1 comprising third contacting the procatalyst intermediate with an alkoxyalkyl ester and a halogenating agent.

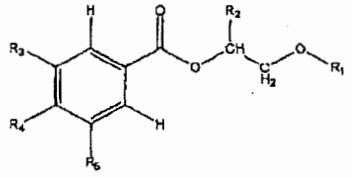
6. A process comprising:

first halogenating a procatalyst precursor to form a reaction mixture;

heating the reaction mixture to a temperature from 30°C to 150°C;

first adding an aromatic alkoxyalkyl ester to the reaction mixture from greater than 0 minutes to 30 minutes after the heating to form a procatalyst intermediate, the aromatic alkoxyalkyl ester having the structure (III)

(III)



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wherein R_1 and R_2 are the same or different, R_1 is selected from the group consisting of a C_1-C_{20} primary alkyl group, a substituted C_1-C_{20} primary alkyl group, and a C_2-C_{20} alkene group;

R_2 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, and a C_2-C_{20} alkene group; and

R_3, R_4, R_5 are the same or different, each of R_3, R_4, R_5 is selected from the group consisting of a heteroatom, a C_1-C_{20} hydrocarbyl group, a substituted C_1-C_{20} hydrocarbyl group, and a C_1-C_{20} hydrocarbyloxy group;

second halogenating the procatalyst intermediate;

second adding an alkoxyalkyl ester to the procatalyst intermediate; and

forming particles of a procatalyst composition, the particles having a particle size distribution (PSD) span of less than 2.0.

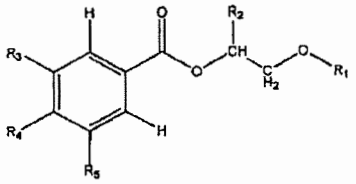
7. The process of claim 6 comprising second heating the procatalyst intermediate to a temperature from 30°C to 150°C before the second adding.

8. The process of claim 6 comprising forming a procatalyst composition comprising a combination of a magnesium moiety, a titanium moiety and greater than 10 wt % of the aromatic alkoxyalkyl ester.

9. A procatalyst composition comprising:

a combination of a magnesium moiety, a titanium moiety, and greater than 10 wt % of a compounded aromatic alkoxyalkyl ester with the structure (III)

(III)



wherein R_1 and R_2 are the same or different, R_1 is selected from the group consisting of a C_1-C_{20} primary alkyl group, a substituted C_1-C_{20} primary alkyl group, and a C_2-C_{20} alkene group;

R_2 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, and a C_2-C_{20} alkene group; and

R_3, R_4, R_5 are the same or different, each of R_3, R_4, R_5 is selected from the group consisting of a heteroatom, a C_1-C_{20} hydrocarbyl group, a substituted C_1-C_{20} hydrocarbyl group, and a C_1-C_{20} hydrocarbyloxy group.

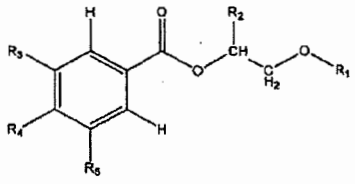
10. The procatalyst composition of claim 9 wherein the aromatic alkoxyalkyl ester is 2-methoxy-1-methylethyl benzoate.

11. The procatalyst composition of claim 9 wherein the aromatic alkoxyalkyl ester is 2-methoxyethyl benzoate.

12. A catalyst composition comprising:

a procatalyst composition comprising a combination of a magnesium moiety, a titanium moiety, and greater than 10 wt% of a compounded aromatic alkoxyalkyl ester with the structure (III)

(III)



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wherein R_1 and R_2 are the same or different, R_1 is selected from the group consisting of a C_1-C_{20} primary alkyl group, a substituted C_1-C_{20} primary alkyl group, and a C_2-C_{20} alkene group;

R_2 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, and a C_2-C_{20} alkene group; and

R_3, R_4, R_5 are the same or different, each of R_3, R_4, R_5 is selected from the group consisting of a heteroatom, a C_1-C_{20} hydrocarbyl group, a substituted C_1-C_{20} hydrocarbyl group, and a C_1-C_{20} hydrocarbyloxy group;

a cocatalyst; and

optionally an external electron donor.

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CLAIMS

1. An invention not claimed in any divisional application.