CLAIMS:

1. An isolated solid catalyst component for olefin polymerization, the component comprising a reaction product of:
   a halide-containing magnesium compound;
   a titanium halide compound;
   a supportive donor comprising a benzoate;
   an internal electron donor; and
   an activity control agent (ACA) comprising at least one of:
      a first organosilicon compound containing Si-O groups being present in the catalyst component in an amount from about 0.1 to about 5% by weight;
      an organic ester of a C_4 to C_{30} aliphatic acid or a poly(alkene glycol) ester of a C_4 to C_{30} aliphatic acid in amount from about 0.1% to about 15% by weight; and
      an organo-aluminum compound containing an alkyl group,
   wherein at least a part of the ACA is chemically bonded to the halide-containing magnesium compound.

2. The solid catalyst component of claim 1, wherein the supportive electron donor is present in the catalyst component in an amount from about 0.5% to about 7% by weight, and the internal electron donor is present in the catalyst component in an amount from about 3% to about 25% by weight.

3. The solid catalyst component of claim 1 or claim 2, wherein the internal electron donor comprises a diester, a diether, a succinate, or any combination thereof.

4. The solid catalyst component of any one of claims 1-3, wherein the halide-containing magnesium compound comprises magnesium chloride.

5. The solid catalyst component of any one of claims 1-4, wherein the first organosilicon compound is a silane, siloxane or polysiloxane having the following chemical structure:

$$R_nSi(OR')_{4-n}$$

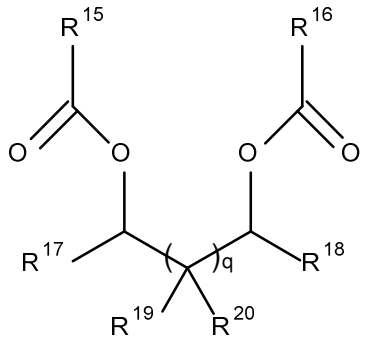
wherein:

each R is H, alkyl, or aryl;

each R' is H, alkyl, aryl, or a $SiR_{n'}(OR')_{3-n}$; and

n is 0, 1, 2, or 3.

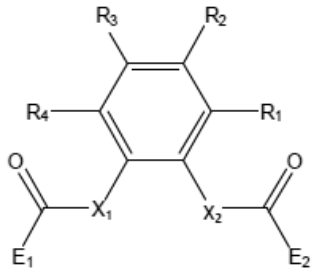
6. The solid catalyst component of any one of claims 1-5, wherein the internal electron donor is represented by the following formula:



wherein:

each of R^{15} through R^{20} are independently H, F, Cl, Br, I, alkyl, cycloalkyl, cycloalkylalkyl, aryl, aralkyl, heterocyclyl, heterocyclylalkyl, heteroaryl, or heteroarylalkyl; and

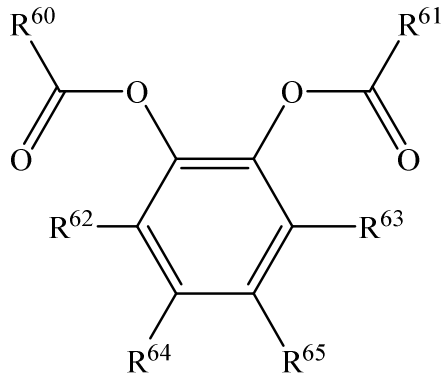
q is an integer from 0 to 12; or wherein the internal electron donor is represented by one of the following formulas:



where R_1-R_4, are the same or different and each R_1-R_4 is selected from the group consisting of hydrogen, a substituted hydrocarboyl group having 1 to 20 carbon atoms, an unsubstituted hydrocarobyl having 1 to 20 carbon atoms, a substituted or unsubstituted aryl group having 6 to 20 carbons, an alkoxy group having 1 to 20 carbon atoms, a heteroatom and combinations thereof and at least one of R_1-R_4 is not hydrogen; and

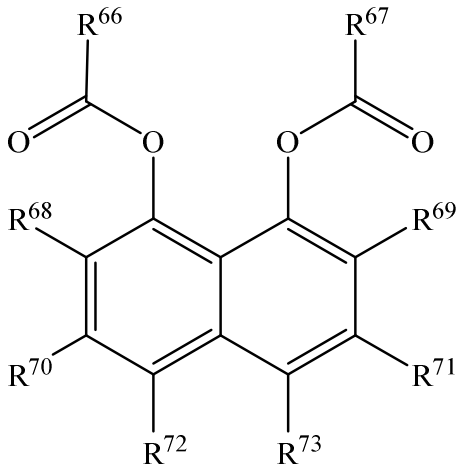
E_1 and E_2 are the same or different and each $E_1$and E_2 is selected from the group consisting of a substituted hydrocarboyl group having 1 to 20 carbon atoms, an unsubstituted hydrocarobyl having 1 to 20 carbon atoms, a substituted or unsubstituted aryl group having 6 to 20 carbons, an alkoxy group having 1 to 20 carbon atoms, a heteroatom and combinations thereof

wherein X_1 and X_2 are each O, S, an alkyl group, or NR_5 and wherein R_5 is a hydrocarbyl group having 1 to 20 carbon atoms or is hydrogen;

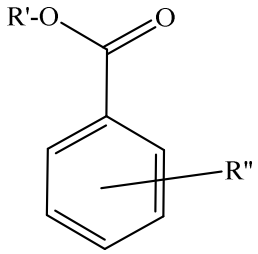


wherein:

each of R^{60} through R^{65} are independently H, F, Cl, Br, I, alkyl, cycloalkyl, cycloalkylalkyl, aryl, aralkyl, heterocyclyl, heterocyclylalkyl, heteroaryl, or heteroarylalkyl; or



wherein each of R^{66} through R^{73} are independently H, F, Cl, Br, I, alkyl, cycloalkyl, cycloalkylalkyl, aryl, aralkyl, heterocyclyl, heterocyclylalkyl, heteroaryl, or heteroarylalkyl groups; or wherein the supportive electron donor has the following formula:



wherein R' comprises an alkyl group, a cyclic group, an aryl group having from 1 to 20 carbon atoms, a heteroatom or a combination thereof, and wherein R'' comprises one or more substituted groups, each substituted group can comprise independently hydrogen, an alkyl group, a cyclic group, an aryl group having from 1 to 20 carbon atoms, a heteroatom, or a combination thereof.

7. The solid catalyst component of any one of claims 1-6, further comprising a second organosilicon compound different from the first organosilicon compound; and wherein the second organosilicon compound comprises tetraethylorthosilicate and/or polydimethyl siloxane, and the first organosilicon compound comprises

dicyclopentyldimethoxysilane, cyclohexylmethyldimethoxysilane, n-propyltrimethoxysilane, trimethoxysilane, or any combination thereof.

8. The solid catalyst component of any one of claims 1-7, wherein the ACA comprises an organosilicon compound and no organo-aluminum component is contained in the catalyst component; or wherein the ACA comprises a combination of a) dicyclopentyldimethoxysilane, cyclohexylmethyldimethoxysilane, n-propyltrimethoxysilane, and/or trimethoxysilane and b) an organo-aluminum compound containing an alkyl group; or wherein the ACA comprises an organo-aluminum compound and no organosilicon compound is present in the catalyst component other than polydialkylsiloxane and/or tetraalkoxysilane; or wherein the ACA comprises an organic ester of a aliphatic C4-C30 mono- or di-carboxylic acid.

9. The solid catalyst component of claim 8, wherein the organic ester is selected from the group consisting of isopropyl myristate, di-n-butyl sebacate, (poly)(alkylene glycols), mono- or di-myristates, pentyl valerate, and combinations thereof.

10. The solid catalyst component of any one of claims 1-8, wherein the ACA comprises a combination of a) dicyclopentyldimethoxysilane, cyclohexylmethyldimethoxysilane, n-propyltrimethoxysilane, and/or trimethoxysilane and b) an organic ester selected from the group consisting of isopropyl myristate, di-n-butyl sebacate, (poly)(alkylene glycols), mono- or di-myristates, pentyl valerate, and combinations thereof.

11. The solid catalyst component of any one of claims 1-10, wherein the solid catalyst component does not contain a polyolefin.

12. The solid catalyst component of any one of claims 1-11, wherein the catalyst component exhibits a catalytic activity at 90°C that is at least about 10% less than the catalytic activity exhibited at 80°C under the otherwise same conditions, determined by polymerizing propylene a bulk propylene reactor over a time period of 30 minutes.

13. A process for producing a solid catalyst component, the process comprising:

forming a catalyst precursor component by reacting a magnesium alkoxide $Mg(OR)_nX_{2-n}$ or magnesium alcoholate $MgX_2mR'OH$ with $Ti(OR'')_gX_{4-g}$ wherein X is Br, Cl, or I; n is 1, 2; m is 0.5-10; g is 0, 1, 2, 3, or 4; and R, R', R'' are independently C1-C10 alkyl, the catalyst precursor containing a supportive electron donor and an internal electron donor;

reacting the catalyst precursor component with at least one of:

a first organosilicon compound having the following formula: $R_2nSi(OR_3)_{4-n}$, wherein R_2 is H, alkyl, or aryl; each R_3 is alkyl, or aryl; n is 0, 1, 2 or 3 in hydrocarbon solvent;

an organic ester from a C4 to C30 aliphatic acid ester or a poly(alkene glycol) ester of a C4 to C30 aliphatic acid; or

an alkyl aluminum compound; and

isolating the solid catalyst component.

14. The process of claim 13, further comprising isolating and or/drying the catalyst precursor compound before the reacting the catalyst precursor step.

15. A process for producing an olefin polymer, the process comprising polymerizing an olefin in the presence of an isolated solid catalyst component, the solid catalyst component comprising a reaction product of:

a halide-containing magnesium compound;

a titanium halide compound;

at least one internal electron donor; and

an activity control agent (ACA) comprising at least one of:

a first organosilicon compound containing Si-O groups being present in the catalyst component in an amount from about 0.1 to about 5% by weight;

an organic ester of a C4 to C30 aliphatic acid or a poly(alkene glycol) ester of a C4 to C30 aliphatic acid in amount from about 0.1% to about 15% by weight; and

an organo-aluminum compound containing an alkyl group,

wherein at least a part of the ACA is chemically bonded to the halide-containing magnesium compound, and wherein the solid catalyst component is not prepared in a polymerization reactor.