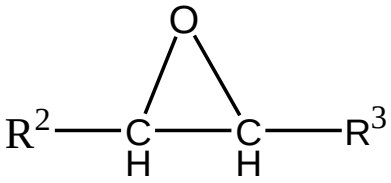
Claims

1. A catalyst component for olefin polymerization, which is obtained by mixing a magnesium halide solution containing an organic epoxy compound with a halogen-containing compound to precipitate a solid;

wherein, the organic epoxy compound is a three membered epoxy compound as shown in Formula I,



(I)

wherein, R^2 are R^3 are independently selected from H, or C_1-C_{10} hydrocarbyl or halogenated hydrocarbyl, and can be a saturated or unsaturated straight, branched, or cyclic chain; or the organic epoxy compound is a 4-8 membered epoxy compound;

the halogen-containing compound comprises at least one selected from the group consisting of acyl halide compounds and halogen and silicon-containing compounds;

the halogen and silicon-containing compound contains at least one silicon-halogen bond; and

the magnesium halide solution is formed by dissolving an anhydrous magnesium halide into a mixed solvent which comprises an oxygen-containing organic titanium compound, the organic epoxy compound, a hydroxy-containing compound, and an inert solvent, and does not comprise a phosphate or a phosphite compound.

2. The catalyst component according to claim 1, wherein the magnesium halide solution is formed by dissolving the anhydrous magnesium halide into a mixed solvent which is comprised of the oxygen-containing organic titanium compound, the organic epoxy compound, the hydroxy-containing compound, and the inert solvent .

3. The catalyst component according to claim 1, wherein the magnesium halide is as shown in Formula MgX_2, in which X is halogen; the oxygen-containing organic titanium compound is as shown in Formula $Ti(OR^1)_nX_{4-n}$, in which R^1 is C_1-C_{20} hydrocarbyl, and can be a saturated or unsaturated straight, branched, or cyclic chain,

$0<n\leq4$, and X is halogen; the hydroxy-containing compound is as shown in Formula HOR^4, in which R^4 is C_1-C_{20} hydrocarbyl, and can be a saturated or unsaturated straight, branched, or cyclic chain; the inert solvent is C_3-C_{100} aliphatic hydrocarbon or halogenated aliphatic hydrocarbon, aromatic hydrocarbon or halogenated aromatic hydrocarbon, and can be a saturated or unsaturated straight, branched, or cyclic chain.

4. The catalyst component according to claim 1, wherein the magnesium halide is selected from the group consisting of magnesium chloride, magnesium bromide, magnesium iodide and mixtures thereof; the oxygen-containing organic titanium compound is selected from the group consisting of titanate compounds and mixtures thereof; the hydroxy-containing compound is selected from the group consisting of aliphatic alcohols, aromatic alcohols, and phenols; the inert solvent is selected from the group consisting of benzene, toluene, xylene, n-butane, isobutane, isopentane, pentane, n-hexane, cyclohexane, heptane, octane, decane, 1,2-dichloroethane, chlorobenzene and mixtures thereof.

5. The catalyst component according to claim 1, wherein calculated based on per molar magnesium halide, the oxygen-containing organic titanium compound is 0.01-2.0 mol; the organic epoxy compound is 0.01-10 mol; the hydroxy-containing compound is 0.01-20 mol; the halogen-containing compound is 0.1-100 mol.

6. The catalyst component according to claim 1, wherein the organic epoxy compound is one or more selected from the group consisting of ethylene oxide, propylene oxide, butylenes oxide, butadiene oxide, butadiene dioxide, epoxy chloropropane, methyl glycidyl ether, diglycidyl ether, and terahydrofuran.

7. The catalyst component according to claim 1, wherein the acyl halide compound is a compound as shown in Formula R^5COX, in which R^5 is C_1-C_{20} hydrocarbyl, or hydrogen, and can be a saturated or unsaturated straight, branched, or cyclic chain, and X is halogen.

8. The catalyst component according to claim 7, wherein the acyl halide

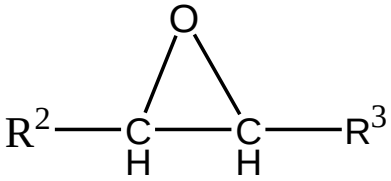
compound comprises at least one selected from the group consisting of acyl fluoride compound, acyl chloride compound, acyl bromide compound, and acyl iodide compound.

9. The catalyst component according to claim 1, wherein the halogen and silicon-containing compound is a compound as shown in Formula $(R^5O)_qSiR^6_nX_{4-n-q}$, in which R^5 and R^6 are independently selected from C_1-C_{20} hydrocarbyl or halogenated hydrocarbyl, and can be saturated or unsaturated straight, branched, or cyclic chain; each of q and n is 0 or a positive number, and $0 \leq q+n \leq 3$; X is halogen.

10. The catalyst component according to claim 9, wherein the halogen and silicon-containing compound is at least one selected from the group consisting of silicon tetrachloride, silicon tetrabromide, ethoxysilicon trichloride, phenylsilicon trichloride, methylsilicon trichloride, ethylsilicon trichloride, diethoxysilicon dichloride, methylmethoxysilicon dichloride, and methylphenoxysilicon dichloride.

11. A preparation method of the catalyst component according to claim 1, comprising firstly dissolving an anhydrous magnesium halide into a mixed solvent which comprises an oxygen-containing organic titanium compound, an organic epoxy compound, a hydroxy-containing compound, and an inert solvent, and does not comprise a phosphate or a phosphite compound, so as to form a magnesium halide solution; then mixing the magnesium halide solution with a halogen-containing compound to precipitate a solid, so as to obtain the catalyst component;

wherein the organic epoxy compound is a three membered epoxy compound as shown in Formula I,



(I)

wherein, R^2 are R^3 are independently selected from H, or C_1-C_{10} hydrocarbyl or halogenated hydrocarbyl, and can be saturated or unsaturated straight, branched, or cyclic chain; or the organic epoxy compound is a 4-8 membered epoxy compound;

the halogen-containing compound comprises at least one selected from the group consisting of acyl halide compounds and halogen and silicon-containing compounds.

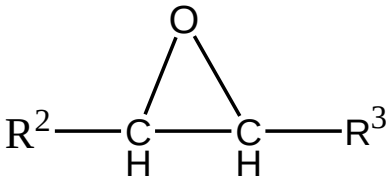
12. The method according to claim 11, wherein the magnesium halide solution is formed by dissolving an anhydrous magnesium halide into a mixed solvent consisting of an oxygen-containing organic titanium compound, an organic epoxy compound, hydroxy-containing compound, and an inert solvent.

13. A catalyst for olefin polymerization, comprising a reaction product of the following components:

(a) the catalyst component according to claim 1;

(b) at least one organic aluminium compound as shown in Formula AlR_mX_{3-m}, in which R is hydrogen or C_1-C_{20} hydrocarbyl, X is halogen, and m is $0<m\leq3$.

14. A magnesium halide solution system used for the preparation process of a catalyst component for olefin polymerization, comprising an oxygen-containing organic titanium compound, an organic epoxy compound, a hydroxy-containing compound, and an inert solvent, wherein the magnesium halide solution system does not comprise a phosphate or a phosphite compound, further wherein the organic epoxy compound is a three membered epoxy compound as shown in Formula I,



(I)

wherein, R^2 are R^3 are independently selected from H, or C_1-C_{10} hydrocarbyl or halogenated hydrocarbyl, and can be saturated or unsaturated straight, branched, or cyclic chain; or the organic epoxy compound is a 4-8 membered epoxy compound.

15. The magnesium halide solution system according to claim 14, wherein the magnesium halide solution system is a mixed solvent which is comprised of an oxygen-containing organic titanium compound, an organic epoxy compound, a hydroxy-containing compound, and an inert solvent.

16. The catalyst component according to claim 3, wherein the inert solvent is a C_4-C_{20} hydrocarbon.

17. The catalyst component according to claim 4, wherein the oxygen-containing organic titanium compound is selected from the group consisting of tetraethyl titanate, tetraisopropyl titanate, tetrabutyl titanate, and tetraisooctyl titanate.

18. The catalyst component according to claim 4, wherein the hydroxyl-containing compound is selected from the group consisting of methanol, ethanol, isopropanol, n-butanol, n-hexanol, isooctanol, benzyl alcohol, and phenethyl alcohol.

19. The catalyst component according to claim 5, wherein calculated based on per molar magnesium halide, the oxygen-containing organic titanium compound is 0.1-1.5 mol; the organic epoxy compound is 0.1-6.5 mol; the hydroxyl-containing compound is 0.1-15 mol; the halogen-containing compound is 0.5-50 mol.

20. The catalyst component according to claim 8, wherein the acyl halide compound is an acyl chloride compound.

21. The catalyst component according to claim 10, wherein the halogen and silicon-containing compound is at least one selected from the group consisting of silicon tetrachloride, silicon tetrabromide, ethoxysilicon trichloride, and phenylsilicon trichloride.