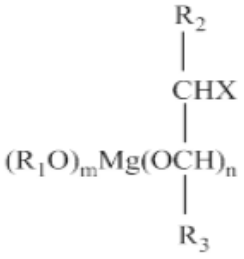
We claim:

1. A carrier of polyolefin catalysts, comprising:

(i) a magnesium compound represented by the following formula (1):



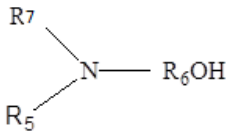
(1),

wherein R_1 is a C_1 to C_{12} linear or branched alkyl; R_2 and R_3, which are the same or different, are hydrogen or an unsubstituted or halogenated C_1 to C_5 linear or branched alkyl; X is a halogen; m is 0.1 to 1.9; n is 0.1 to 1.9; and m+n = 2;

(ii) a Lewis base (LB), and

(iii) optionally, a metal component other than magnesium, preferably the other metal component is one or both of iron and cupper; preferably the content of the other metal component in terms of metal in the solid component is from 0 to 1 wt%,

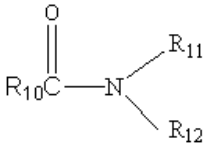
wherein the Lewis base is a compound represented by general formula (II),



(II)

wherein, R_5 and R_7, which are the same or different, are hydrogen or an unsubstituted or hydroxyl-substituted C_1 to C_8 linear or branched alkyl; R_6 is a C_1 to C_8 linear or branched alkylene; or

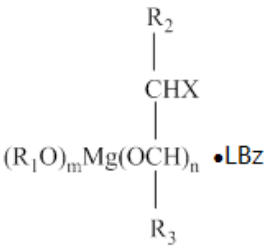
the Lewis base is an amide compound represented by general formula (II′),



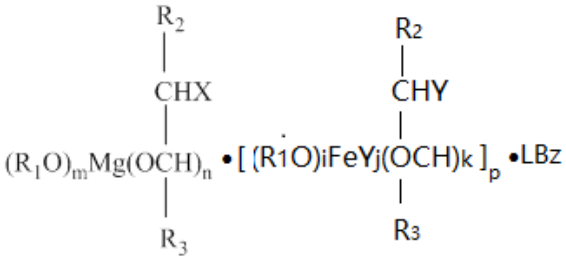
(II′)

wherein, R_{10} is hydrogen, amino or a C_1 to C_8 linear or branched alkyl, and R_{11} and R_{12}, which are the same or different, are hydrogen or a C_1 to C_8 linear or branched alkyl.

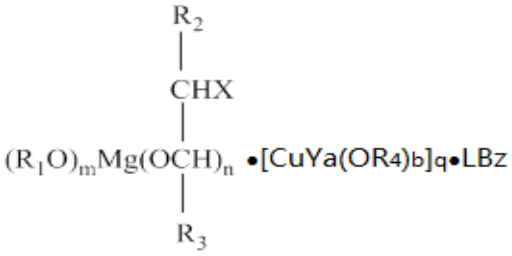
2. The carrier of polyolefin catalysts as claimed in claim 1, which comprises a composition represented by general formulae (I), (I′) or (I″):



(I),



(I′),



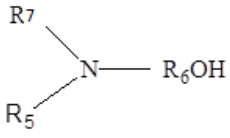
(I″)

wherein, in the formula (I′), R_1 is a C_1 to C_{12} linear or branched alkyl; R_2 and R_3, which are the same or different, are hydrogen or an unsubstituted or halogenated C_1 to C_5 linear or branched alkyl; X and Y independently represent a halogen; m is 0.1 to 1.9; n is 0.1 to 1.9; m+n = 2; $0<i\leq 2$; $0<j\leq 2$; $0<k\leq 2$; i+j+k = 3; $0<p\leq 0.1$; and $0<z<0.1$;

in the formula (I), R_1 is a C_1 to C_{12} linear or branched alkyl; R_2 and R_3, which are the same or different, are hydrogen or an unsubstituted or halogenated C_1 to C_5 linear or branched alkyl; X is a halogen; m is 0.1 to 1.9; n is 0.1 to 1.9; m+n = 2; and $0<z<0.5$;

in the formula (I″), R_1 is a C_1 to C_{12} linear or branched alkyl; R_2 and R_3, which are the same or different, are hydrogen or an unsubstituted or halogenated C_1 to C_5 linear or branched alkyl; X and Y independently represent a halogen; m is 0.1 to 1.9; n is 0.1 to 1.9; m+n = 2; $0\leq a<2$, $0<b\leq 2$, a+b = 2; $0<q<0.1$; and $0\leq z<0.1$;

LB is a compound represented by general formula (II),



(II)

wherein R_5 and R_7, which are the same or different, are hydrogen or an unsubstituted or hydroxyl-substituted C_1 to C_8 linear or branched alkyl; and R_6 is a C_1 to C_8 linear or branched alkylene.

3. The carrier of polyolefin catalysts as claimed in claim 2, having at least one of the following features:

- in the general formula (I), the general formula (I′) or the general formula (I″), R_1 is a C_1 to C_8 linear or branched alkyl, preferably R_1 is selected from the group consisting of ethyl, n-propyl, isopropyl, n-butyl, isobutyl, n-pentyl, isopentyl, n-hexyl, n-octyl and 2-ethylhexyl;

- in the general formula (I), the general formula (I′) or the general formula (I″), R_2 and R_3 are each independently hydrogen, a C_1 to C_3 linear or branched alkyl or a halogenated C_1 to C_3 linear or branched alkyl, preferably R_2 and R_3 are each independently hydrogen, methyl, ethyl, chloromethyl, chloroethyl, bromomethyl or bromoethyl;

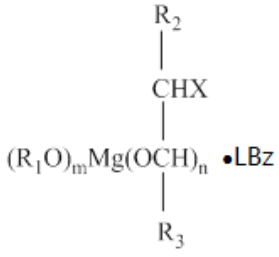
- in the general formula (II), R_5 and R_7 are hydrogen or a C_1 to C_5 linear or branched alkyl, and R_6 is a C_1 to C_5 linear or branched alkylene;

- the halogen is selected from the group consisting of chlorine, bromine and iodine, preferably chlorine;

- the compound represented by the general formula (II) is one or more of ethanolamine, diethanolamine, triethanolamine, N,N-dimethylethanolamine, N,N-diethylethanolamine and N-methyldiethanolamine.

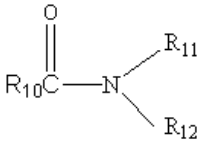
4. The carrier of polyolefin catalysts as claimed in claim 2, characterized in that the carrier has an average particle size, as measured on a laser particle size analyzer, of from 10 to 100 microns, preferably from 30 to 70 microns, and a particle size distribution, as measured on a laser particle size analyzer, of less than 1.2, preferably from 0.7 to 0.9.

5. The carrier of polyolefin catalysts as claimed in claim 1, comprising a composition represented by the general formula (I‴):



(I‴)

wherein R_1 is a C_1 to C_{12} linear or branched alkyl; R_2 and R_3, which are the same or different, are hydrogen or an unsubstituted or halogenated C_1 to C_5 linear or branched alkyl; X is a halogen; m is 0.1 to 1.9; n is 0.1 to 1.9; m+n = 2; $0<z<0.5$; LB is an amide compound represented by the general formula (II′),


(II′)

wherein R_{10} is hydrogen, amino or a C_1 to C_8 linear or branched alkyl, and R_{11} and R_{12}, which are the same or different, are hydrogen or a C_1 to C_8 linear or branched alkyl.

6. The carrier as claimed in claim 5, having at least one of the following features:

- R_1 is a C_1 to C_8 linear or branched alkyl, preferably R_1 is selected from the group consisting of ethyl, n-propyl, isopropyl, n-butyl, isobutyl, n-pentyl, isopentyl, n-hexyl, n-octyl and 2-ethylhexyl;

- R_2 and R_3 are each independently hydrogen, a C_1 to C_3 linear or branched alkyl or a halogenated C_1 to C_3 linear or branched alkyl, preferably R_2 and R_3 are each independently methyl, ethyl, chloromethyl, chloroethyl, bromomethyl and bromoethyl;

- R_{10} is hydrogen, amino or a C_1 to C_5 linear or branched alkyl, and R_{11} and R_{12} are hydrogen or a C_1 to C_5 linear or branched alkyl;

- the halogen is selected from the group consisting of chlorine, bromine and iodine, preferably chlorine;

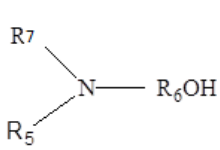
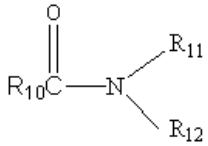
- the amide compound is one or more of formamide, acetamide, propionamide, N-methylacetamide, N,N-dimethylacetamide and carbonamide;

- the carrier is spherical and has an average particle size, as measured on a laser particle size analyzer, of from 10 to 100 microns, preferably from 30 to 70 microns, and a particle size distribution, as measured on a laser particle size analyzer, of less than 1.2, preferably from 0.7 to 0.9.

7. The carrier as claimed in claim 5, further comprising a metal component other than magnesium, preferably the other metal component is one or both of iron and cupper; preferably the content of the other metal component in the solid component is from 0 to 1 % by weight.

8. A method for preparing the carrier for polyolefin catalysts, comprising the steps of:

(a) reacting a magnesium halide represented by general formula MgX_2, an optional metal halide, an alcohol compound represented by general formula R_1OH, and a compound represented by general formula (II) or (II′) to form a solution,


(II),

(II′)

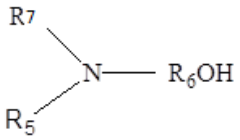
wherein, X is a halogen; R_1 is a C_1-C_{12} linear or branched alkyl; R_5 and R_7, which are the same or different, are hydrogen or an unsubstituted or hydroxyl-substituted C_1-C_8 linear or branched alkyl; R_6 is a C_1-C_8 linear or branched alkylene; R_{10} is hydrogen, amino or a C_1-C_8 linear or branched alkyl; and R_{11} and R_{12}, which are the same or different, are hydrogen or a C_1-C_8 linear or branched alkyl;

(b) reacting the solution formed in step (a) with an epoxy compound to directly generate spherical solid particles; and

(c) recovering the spherical solid particles formed in step (b).

9. The method as claimed in claim 8, comprising the steps of:

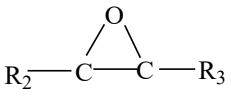
(a) reacting the magnesium halide represented by the general formula MgX_2, an optional metal halide of the structure formula FeY_2 or an optional metal halide of the structure formula CuYc, the alcohol compound represented by the general formula R_1OH and the compound represented by the general formula (II) to form a solution,



(II)

wherein R_1 is a C_1-C_{12} linear or branched alkyl, R_5 and R_7, which are the same or different, are hydrogen or an unsubstituted or hydroxyl-substituted C_1-C_8 linear or branched alkyl; R_6 is a C_1-C_8 linear or branched alkylene, X and Y are a halogen, and c=1 or 2;

(b) reacting the solution formed in step (a) with an epoxy compound to directly generate spherical solid particles, preferably the epoxy compound is represented by the general formula (III),



(III)

wherein R_2 and R_3, which are the same or different, are hydrogen or an unsubstituted or halogenated C_1 to C_5 linear or branched alkyl; and

(c) recovering the spherical solid particles formed in step (b).

10. The method as claimed in claim 9, having at least one of the following features:

- R_1 is a C_1 to C_8 linear or branched alkyl, preferably R_1 is a C_1 to C_6 linear or branched alkyl;

- R_5 and R_7 are hydrogen or a C_1 to C_5 linear or branched alkyl, and R_6 is a C_1 to

C_5 linear or branched alkylene;

- R_2 and R_3 are each independently hydrogen, a C_1 to C_3 linear or branched alkyl or a halogenated C_1 to C_3 linear or branched alkyl;

- in step (a), a polymeric dispersion stabilizer is added during the preparation of the solution, with the weight average molecular weight of the polymeric dispersion stabilizer being greater than 1000, preferably greater than 3000;

- the magnesium halide is one or more of magnesium dichloride, magnesium dibromide, and magnesium diiodide;

- the metal halide is one or more of ferrous chloride, ferrous chloride tetrahydrate, ferrous bromide, and ferrous iodide, preferably ferrous chloride and its hydrates;

- the carrier has an average particle size, as measured on a laser particle size analyzer, of from 10 to 100 microns, preferably from 30 to 70 microns;

- the carrier has a particle size distribution, as measured on a laser particle size analyzer, of less than 1.2, preferably from 0.7 to 0.9;

- in step (a), the preparation of the solution is carried out at a temperature of from 30 to 160 °C, preferably from 40 to 120 °C;

- the amount of the R_1OH compound added is from 3 to 30 moles, preferably from 4 to 25 moles, relative to one mole of magnesium;

- a molar ratio of the compound represented by the general formula (II) to the magnesium halide is 1:100 to 1:5, preferably 1:50 to 1:5;

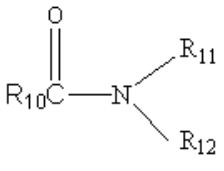
- the amount of the metal halide added is 0.001 to 0.1 moles, preferably 0.003 to 0.08 moles, relative to one mole of magnesium;

- in step (b), the reaction temperature is from 30 to 160 °C, preferably from 40 to 120 °C;

- in step (b), the amount of the oxirane-type compound added is 1 to 10 moles, preferably 2 to 6 moles, relative to one mole of magnesium.

11. The method as claimed in claim 8, comprising the steps of:

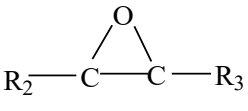
(a) reacting the magnesium halide represented by the general formula MgX_2 with the alcohol compound represented by the general formula R_1OH and the amide compound represented by the general formula (II′) to form a solution,



(II′)

wherein R_1 is a C_1-C_{12} linear or branched alkyl, R_{10} is hydrogen, amino or a C_1-C_8 linear or branched alkyl, R_{11} and R_{12}, which are the same or different, are hydrogen or a C_1-C_8 linear or branched alkyl, and X is a halogen;

(b) reacting the solution formed in step (a) with an epoxy compound to directly generate spherical solid particles, preferably the epoxy compound is represented by the general formula (III),



(III)

wherein R_2 and R_3, which are the same or different, are hydrogen or an unsubstituted or halogenated C_1 to C_5 linear or branched alkyl.

12. The method as claimed in claim 11, having at least one of the following features:

- R_1 is a C_1 to C_8 linear or branched alkyl;

- R_{10} is hydrogen, amino or a C_1 to C_5 linear or branched alkyl, and R_{11} and R_{12} are hydrogen or a C_1 to C_5 linear or branched alkyl;

- R_2 and R_3 are each independently hydrogen, a C_1 to C_3 linear or branched alkyl or a halogenated C_1 to C_3 linear or branched alkyl;

- in step (a), a reductive metal halide is added during the preparation of the solution, preferably the metal halide having a formula of MY_a, wherein Y is a halogen, M is one or more of iron and cupper, and a is 1 or 2, more preferably the metal halide being selected from the group consisting of CuCl and $FeCl_2$; and the amount of the metal halide added is 0.001 to 0. 1moles, preferably 0.003 to 0.08 moles, relative to one mole of magnesium;

- in step (a), a polymeric dispersion stabilizer is added during the preparation of the solution, with the weight average molecular weight of the polymeric dispersion stabilizer being greater than 1000, preferably greater than 3000;

- in step (a), the preparation of the solution is carried out at a temperature of from 30 to 160 °C, preferably from 40 to 120 °C;

- in step (a), the amount of the R_1OH compound added is from 3 to 30 moles, preferably from 4 to 25 moles, relative to one mole of magnesium;

- a molar ratio of the compound represented by the general formula (II′) to the magnesium halide is 1:100 to 1:5, preferably 1:50 to 1:5;

- in step (b), the reaction temperature is from 30 to 160 °C, preferably from 40 to 120 °C;

- in step (b), the amount of the oxirane-type compound added is 1 to 10 moles, preferably 2 to 6 moles, relative to one mole of magnesium;

- the solid component is spherical, and has an average particle size, as measured on a laser particle size analyzer, of from 10 to 100 microns, preferably from 30 to 70 microns, and a particle size distribution, as measured on a laser particle size analyzer, of less than 1.2, preferably from 0.7 to 0.9.

13. A catalyst component for olefin polymerization, comprising a reaction product of the carrier as claimed in any one of claims 1 to 7 with a titanium compound and an internal electron donor compound.

14. A catalyst system for olefin polymerization, comprising the catalyst component as claimed in claim 13, an alkylaluminum compound, and optionally an external electron donor compound.

15. A method for olefin polymerization, comprising contacting one or more olefins with the catalyst system as claimed in claim 14 under olefin polymerization conditions to form a polyolefin, and recovering the resulting polyolefin.