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(54) **CATALYST COMPONENT FOR OLEFIN POLYMERIZATION REACTION AND CATALYST COMPRISING SAME**

KATALYSATOR-KOMPONENTE FÜR EINE OLEFIN-POLYMERISIERUNGSREAKTION UND KATALYSATOR DAMIT

COMPOSANT DE CATALYSEUR POUR RÉACTION DE POLYMÉRISATION D'OLÉFINES, ET CATALYSEUR COMPRENANT CE COMPOSANT

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Description

Technical Field

[0001] The present invention relates to a solid catalyst component comprising diol diester compound with a special structure and the preparation thereof. The present invention also relates to a catalyst comprising said solid catalyst component and its use in olefin polymerization, especially in propylene polymerization.

Technical Background

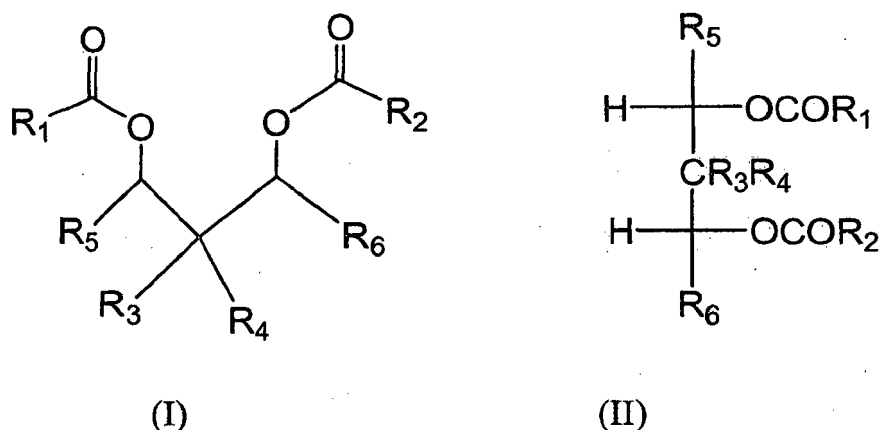
[0002] It is well known that, the solid Ti catalyst component comprising magnesium, titanium, halogen and electron donor as basic ingredients can be used in the polymerization of olefins, and especially used in the polymerization of alpha olefins having three or more carbon atoms for obtaining polymers with a higher stereoregularity in a higher yield. Electron donor compound is one of the essential ingredients of the catalyst component. With the development of the internal electron donor compound, new catalysts for polyolefin are developed constantly. At present, a large amount of electron donor compounds have been disclosed, for instance, polycarboxylic acid, monocarboxylic ester or polycarboxylic ester, anhydride, ketone, monoether or polyether, alcohol, amine and derivatives thereof.

[0003] A kind of 1,3-diol diester compound is disclosed in CN1453298A and CN1580034A. A catalyst with excellent comprehensive properties can be obtained by using said 1,3-diol diester compound as electron donor in the catalyst for olefin polymerization. When the catalyst is used for propylene polymerization, higher polymerization activity and higher stereospecificity can be obtained, and the molecular weight distribution of the obtained polymer is wide as well. However, the activity and stereospecificity of the catalyst are not satisfactory. And especially in the production of polymers with high melt index, the isotactic index of the obtained polymers is not high enough, and thus an further improvement is needed.

[0004] As to the 1,3-diol diester compound disclosed, when the four groups connected to one carbon atom are different from each other, there are two spatial connection modes for the four groups connected to the carbon atom. The two connection modes are mirror images of each other, as left hand and right hand, and can not be completely superimposed onto each other. This kind of compound is known as "chiral compound". The inventor surprisingly finds that, if the diol diester compounds as shown in Formula (I) with several conformational isomers are used as internal electron donor to prepare the catalyst, the activity and stereospecificity of the catalyst would be satisfactory only when the catalyst contains a certain amount of isomer with Fischer projection formula as shown in Formula (II). And especially in the production of polymers with high melt index, the isotactic index of the obtained polymers is increased substantially.

Summary of the Invention

[0005] An object of the invention is to provide a catalyst component for olefin polymerization, comprising magnesium, titanium, halogen and electron donor, wherein the electron donor is selected from at least one of the diol diester compounds as shown in Formula (I), and in said diol diester compounds as shown in Formula (I), the content of the diol diester compound with Fischer projection formula as shown in Formula (II) is greater than or equal to 35wt%:



in both of Formula (I) and Formula (II):

R₁ and R₂, which may be identical to or different from each other, can be (C₃~C₂₀) cycloalkyl, (C₆~C₂₀) aryl or (C₇~C₂₀) alkaryl or aralkyl group, and the hydrogen atom bound to the carbon atom in said cycloalkyl, aryl, alkaryl

or aralkyl group can be optionally substituted by halogen atom, but R_1 and R_2 can not be ($C_3\sim C_{20}$) cycloalkyl simultaneously;

R_3 and R_4 , which may be identical to or different from each other, can be hydrogen atom, halogen atom, ($C_1\sim C_{10}$) straight chain alkyl, ($C_3\sim C_{10}$) branched chain alkyl, ($C_3\sim C_{10}$) cycloalkyl, ($C_6\sim C_{10}$) aryl or ($C_7\sim C_{10}$) alkaryl or aralkyl group, and R_3 and R_4 can be optionally bonded together to form ring; and

R_5 and R_6 , which may be identical to or different from each other, can be halogen atom, ($C_1\sim C_{10}$) straight chain alkyl, ($C_3\sim C_{10}$) branched chain alkyl, ($C_3\sim C_{10}$) cycloalkyl, ($C_6\sim C_{10}$) aryl or ($C_7\sim C_{10}$) alkaryl or aralkyl, and the hydrogen atom bound to the carbon atom in said alkyl, aryl, alkaryl or aralkyl can be optionally substituted by halogen atom.

[0006] As to synthesis of the compounds having chiral carbon atom, especially more than two chiral carbon atoms, unless a special method is used, the synthesized compounds are generally a mixture of several conformational isomers, comprising levo isomer, dextro isomer, symmetric compound and mesomer, wherein the mixture of levo isomer and dextro isomer with the same amount is racemate. Due to different synthesis processes or conditions, the contents of the conformational isomers obtained are different. The reaction binding ability between different conformational isomers and magnesium compound and/or titanium compound is different. Thus in the preparation of catalyst, even in the case of one single kind of diol diester compound is used and the amount thereof is the same, the properties of the final catalyst will be very different from each other due to different contents of each conformational isomer.

[0007] In the present invention, the Fischer projection formula and its naming are determined according to the rules set forth in Pages 40-44 of "System Organic Chemistry" authored by YANG Fengke, LI Ming and LI Fengqi. The principles are as follows: a cross represents the three-dimension skeletal structure of molecule, in which the center of the cross is the chiral carbon atom, the vertical bond extends toward the back of the sheet plane, and the transverse bond extends toward the front of the sheet plane; the Fischer projection formula cannot rotate freely, and the configuration will be changed if the Fischer projection formula rotates 90° , but unchanged if it rotates 180° ; and any two groups of the chiral carbon cannot exchange with each other freely, and the configuration will be changed if they exchange once, but unchanged if exchange twice.

[0008] The binding ability between different conformational isomers of one single compound and magnesium compound or titanium compound is different, and the distance between the atoms of different conformational isomers to be bound with magnesium or titanium is different. It is surprisingly found that when the diol diester compound as shown in Formula (I) is used as electron donor to prepare a catalyst component for olefin polymerization, the binding ability between the diol diester with Fischer projection formula as shown in Formula (II) and magnesium compound and/or titanium compound and the distance between the atoms of said diol diester to be bound with magnesium or titanium are the most suitable, and the comprehensive properties of the obtained catalyst are also the best. Therefore, the higher the content of the diol diester compound with Fischer projection formula as shown in Formula (II) is, the better the comprehensive properties of the catalyst are, and the higher activity and stereospecificity of the catalyst are. Meanwhile, the isotactic index of the obtained polymers is higher especially in the production of polymers with high melt index, so that the mechanical property, especially strength etc., of the obtained polymer will be further increased. The catalyst is suitable to produce the polymers that are required to have an even higher strength. In the present invention, different synthetic methods are used to synthesize the levo isomer, dextro isomer and mesomer (in the following, meso refers to mesomer, i.e. $R_1=R_2$ and $R_5=R_6$ in the Fischer projection formula (II)), and said compound is added according to different proportions in the preparation of the catalyst, so that the content of the compound with Fischer projection formula (II) can meet the experimental requirements. If the diol diester as shown in formula (I) is used as electron donor to prepare said catalyst component for olefin polymerization, only when the content of the diol diester compound with Fischer projection formula as shown in Formula (II) is greater than or equal to 35wt%, the activity and stereotactic ability of the catalyst could be higher, and especially in the production of polymers with high melt index, the isotactic index indicated by boiling n-heptane extracted insolubles could be enhanced significantly, and thus the catalyst can be used to produce polymers with high melt index, high isotactic index and high strength. In order to further improve the activity and stereotactic ability of the catalyst, in the present invention the content of the diol diester compound with Fischer projection formula as shown in Formula (II) is preferably greater than or equal to 51wt%, further preferably greater than or equal to 60wt%, and even further preferably greater than or equal to 80wt%.

[0009] In Formulas (I) and (II): R_1 and R_2 groups are preferably selected from phenyl, halogenated phenyl, alkyl phenyl, halogenated alkyl phenyl, indenyl, benzyl and phenethyl group; R_3 and R_4 groups are preferably selected from hydrogen, chloro, bromo, methyl, ethyl, propyl, isopropyl, butyl and isobutyl group; R_5 and R_6 groups are preferably selected from methyl, ethyl, propyl, isopropyl, butyl and isobutyl group.

[0010] Further preferably, at least one of R_1 and R_2 groups is selected from phenyl, halogenated phenyl, ($C_1\sim C_5$) alkyl phenyl, and ($C_1\sim C_5$) halogenated alkyl phenyl group.

[0011] Even further preferably, R_1 group is the same as R_2 group.

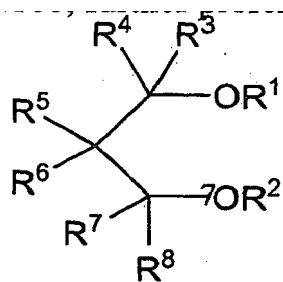
[0012] For said diol diester according to the present invention, some specific examples of the diol diester compounds

with Fisher projection formula as shown in Formula (II) can be selected from, but not limited to, the followings:

meso-2,4-pentanediol dibenzoate,
 meso-3-methyl-2,4-pentanediol dibenzoate,
 meso-3-ethyl-2,4-pentanediol dibenzoate,
 meso-3-propyl-2,4-pentanediol dibenzoate,
 meso-3-butyl-2,4-pentanediol dibenzoate,
 meso-3,3-dimethyl-2,4-pentanediol dibenzoate,
 meso-2,4-pentanediol di(p-methylbenzoate),
 meso-3-chloro-2,4-pentanediol dibenzoate,
 meso-3-bromo-2,4-pentanediol dibenzoate,
 meso-2,4-pentanediol di(m-methylbenzoate),
 meso-2,4-pentanediol di(o-methylbenzoate),
 meso-2,4-pentanediol di(p-ethylbenzoate),
 meso-2,4-pentanediol di(p-butylbenzoate),
 meso-2,4-pentanediol di(p-chlorobenzoate),
 meso-3,5-heptanediol dibenzoate,
 meso-4-methyl-3,5-heptanediol dibenzoate,
 meso-4-dimethyl-3,5-heptanediol dibenzoate,
 meso-4-ethyl-3,5-heptanediol dibenzoate,
 meso-4-propyl-3,5-heptanediol dibenzoate,
 meso-4-butyl-3,5-heptanediol dibenzoate,
 meso-4-chloro-3,5-heptanediol dibenzoate,
 meso-4-bromo-3,5-heptanediol dibenzoate,
 meso-3,5-heptanediol di(p-methylbenzoate),
 meso-3,5-heptanediol di(o-methylbenzoate),
 meso-3,5-heptanediol di(m-methylbenzoate),
 meso-3,5-heptanediol di(p-ethylbenzoate),
 meso-3,5-heptanediol di(p-butylbenzoate),
 meso-3,5-heptanediol di(p-chlorobenzoate),
 (2S,4R)-2,4-pentanediol benzoxy cinnamate,
 (2S,4R)-3-methyl-2,4-pentanediol benzoxy cinnamate,
 (2S,4R)-3-ethyl-2,4-pentanediol benzoxy cinnamate,
 (2S,4R)-3-propyl-2,4-pentanediol benzoxy cinnamate,
 (2S,4R)-3-butyl-2,4-pentanediol benzoxy cinnamate,
 (2S,4R)-3,3-dimethyl-2,4-pentanediol benzoxy cinnamate,
 (2S,4R)-3-chloro-2,4-pentanediol dibenzoate,
 (3S,5R)-3,5-heptanediol benzoxy cinnamate,
 (3S,5R)-4-methyl-3,5-heptanediol benzoxy cinnamate,
 (3S,5R)-4,4-dimethyl-3,5-heptanediol benzoxy cinnamate,
 (3S,5R)-4-ethyl-3,5-heptanediol benzoxy cinnamate,
 (3S,5R)-4-propyl-3,5-heptanediol benzoxy cinnamate,
 (3S,5R)-4-butyl-3,5-heptanediol benzoxy cinnamate,
 (3S,5R)-4-chloro-3,5-heptanediol benzoxy cinnamate,
 (2S,4R)-6-methyl-2,4-heptanediol dibenzoate,
 (2S,4R)-6-methyl-2,4-heptanediol di(p-butyl benzoate),
 (2R,4S)-2,4-pentanediol benzoxy cinnamate,
 (2R,4S)-3-methyl-2,4-pentanediol benzoxy cinnamate,
 (2R,4S)-3-ethyl-2,4-pentanediol benzoxy cinnamate,
 (2R,4S)-3-propyl-2,4-pentanediol benzoxy cinnamate,
 (2R,4S)-3-butyl-2,4-pentanediol benzoxy cinnamate,
 (2R,4S)-3,3-dimethyl-2,4-pentanediol benzoxy cinnamate,
 (2R,4S)-3-chloro-2,4-pentanediol dibenzoate,
 (3R,5S)-3,5-heptanediol benzoxy cinnamate,
 (3R,5S)-4-methyl-3,5-heptanediol benzoxy cinnamate,
 (3R,5S)-4,4-dimethyl-3,5-heptanediol benzoxy cinnamate,
 (3R,5S)-4-ethyl-3,5-heptanediol benzoxy cinnamate,
 (3R,5S)-4-propyl-3,5-heptanediol benzoxy cinnamate,

(3R,5S)-4-butyl-3,5-heptanediol benzoxy cinnamate,
 (3R,5S)-4-chloro-3,5-heptanediol benzoxy cinnamate,
 (2R,4S)-6-methyl-2,4-heptanediol dibenzoate,
 (2R,4S)-6-methyl-2,4-heptanediol di(p-butyl benzoate), and so on.

[0013] In the catalyst component used for olefin polymerization according to the present invention, said electron donor diol diester compound is marked as "a", and the catalyst component further includes electron donor "b", wherein "b" is phthalate diester compound or diether compound as shown in Formula (III), and the molar ratio of "a" to "b" is from 1:0.01 to 1:100, further preferably from 1:0.02 to 1:5,



(III)

in Formula (III), R¹ and R², which may be identical to or different from each other, can be selected from straight chain or branched chain (C₁-C₂₀) alkyl and (C₃-C₂₀) cycloalkyl group; R³-R⁸, which may be identical to or different from each other, can be selected from hydrogen atom, halogen atom, straight chain or branched chain (C₁-C₂₀) alkyl, (C₃-C₂₀) cycloalkyl, (C₆-C₂₀) aryl and (C₇-C₂₀) aralkyl group, and the R³-R⁸ groups can be optionally bonded together to form ring.

[0014] Because the catalyst component contains a certain amount of diol diester compound with Fischer projection formula as shown in Formula (II), the activity of the catalyst and the isotacticity of the polymer have been improved significantly.

[0015] According to the present invention, said catalyst component used for olefin polymerization is preferably obtained by the reaction of magnesium compound and titanium compound with said diol diester compound as defined above. The Formula of titanium compound is TiX_n(OR)_{4-n}, wherein R is hydrocarbonyl group having 1 to 20 carbon atoms, X is halogen, and n is a value satisfying 0 ≤ n ≤ 4. For example, it can be titanium tetrachloride, titanium tetrabromide, titanium tetraiodide, tetrabutoxy titanium, tetraethoxy titanium, triethoxy titanium chloride, diethoxy titanium dichloride and ethoxy titanium trichloride.

[0016] Magnesium compounds can be selected from magnesium dihalide, alkoxy magnesium, alkyl magnesium, hydrate or alcohol adduct of magnesium dihalide, and one of the derivatives formed by replacing a halogen atom of the magnesium dihalide molecular formula with alkoxy or haloalkoxy group, or their mixture. Preferred magnesium compounds are magnesium dihalide, alcohol adduct of magnesium dihalide, and alkoxy magnesium.

[0017] It should be particularly noted that, the magnesium compound is preferably dissolved in a solvent system containing organic epoxy compound and organic phosphorus compound, wherein the organic epoxy compound comprises aliphatic olefins, dienes, halogenated aliphatic olefins, oxides of dienes, glycidyl ethers and inner ethers, all of which have 2 to 8 carbon atoms. Some specific compounds are as follows: ethylene oxide, propylene oxide, epoxy butane, butadiene oxide, butadiene dioxide, epichlorohydrin, methyl glycidyl ether, diglycidyl ether, tetrahydrofuran; wherein the organic phosphorus compound comprises hydrocarbonyl ester or haloalkoxy ester of orthophosphoric acid or phosphorous acid, specifically, such as, trimethyl orthophosphate, triethyl orthophosphate, tributyl orthophosphate, triphenyl orthophosphate, trimethyl phosphite, triethyl phosphite, tributyl phosphite, triphenylmethyl phosphite.

[0018] Magnesium compounds can also be dissolved in a solvent system containing organic alcohol compounds, which are monohydric alcohols with carbon atoms of 2 to 8.

[0019] Different methods can be chosen to prepare the catalyst component according to the present invention. In the following several preparation methods are listed, but it would not restrict the preparation method for the solid catalyst component according to the invention in any way.

[0020] Method 1: preparing the catalyst component according to CN1506384.

[0021] First, magnesium compound and organic alcohol compound with a molar ratio of 2 to 5 are mixed with inert solvent; the temperature is increased to 120 to 150°C, and then phthalic anhydride and an organic silicon compound with a magnesium/ anhydride molar ratio of 5 to 10 and a magnesium/silicon molar ratio of 20 to 50 are added; after

reacting for 1 to 5h, an alcohol adduct is obtained.

[0022] Next, the alcohol adduct which has been cooled to room temperature is added into a solution of titanium compound which is pre-cooled to a temperature of -15 to -40°C, with a titanium/magnesium molar ratio of 20 to 50. The temperature is increased to 90 to 110°C, and then a diol diester compound as shown in Formula (I) with a magnesium/ester molar ratio of 2 to 10 is added. After reacting at a temperature of 100 to 130°C for 1 to 3h, solid particulates are filtered and separated.

[0023] Then, the solid particulates are added into a solution of titanium compound with a titanium/magnesium molar ratio of 20 to 50. The mixture is reacted under stirring at a temperature of 100 to 130°C for 1.5 to 3h, and the solid particulates are filtered and separated.

[0024] Finally, an inert solvent at a temperature of 50 to 80°C is used to wash the solid particulates, and then the catalyst component is obtained after drying.

[0025] Method 2: preparing the catalyst component according to CN85100997.

[0026] First, magnesium compound is dissolved in a solvent system comprising organic epoxy compound, organic phosphorus compound and inert solvent. After a uniform solution is formed, the solution is mixed with titanium compound, and solids are precipitated at the presence of coprecipitation agent. Such solids are treated with the diol diester compound as shown in Formula (I) so that said diol diester compound is loaded on the solids; if necessary, titanium tetrahalide and inert diluent are used to further treat the solids. Coprecipitation agent can be one of organic acid anhydride, organic acid, ether, ketone and ester, or their mixtures, and some specific coprecipitation agents are as follows: acetic anhydride, phthalic anhydride, succinic anhydride, maleic anhydride, pyromellitic dianhydride, acetic acid, propionic acid, butyric acid, acrylic acid, methacrylic acid, acetone, methyl ethyl ketone, diphenyl ketone, methyl ether, ethyl ether, propyl ether, butyl ether, amyl ether, succinate, malonate, glutarate, 2,4-pentanediol diester, 3,5-heptanediol diester, and so on.

[0027] The amount of each said component is calculated by each molar of magnesium halide, wherein organic epoxy compound is from 0.2 to 10 molar, organic phosphorus compound is from 0.1 to 3 molar, coprecipitation agent is from 0 to 1.0 molar, titanium compound is from 0.5 to 150 molar, and the diol ester compound with Formula (I) is from 0.02 to 0.5 molar.

[0028] Method 3: preparing the catalyst component according to CN1091748.

[0029] Spheres of magnesium chloride alcohol adduct are dispersed by high speed stirring in a dispersant system of white oil and silicone oil, and an emulsion is formed. Then the emulsion is unloaded into coolant so as to be cooled and settled rapidly, and microspheres of magnesium chloride alcohol adduct are formed. The coolant is inert hydrocarbon solvent with lower boiling point, such as petroleum ether, pentane, hexane, heptane, and so on. The microspheres of magnesium chloride alcohol adduct obtained are spherical carriers after being washed and dried. The molar ratio of alcohol to magnesium chloride is from 2 to 3, preferably 2 to 2.5. The diameter of carriers is from 10 to 300 μm, preferably 30 to 150 μm.

[0030] Excess amount of titanium tetrachloride is used to treat the above spherical carriers at low temperature. Temperature is increased gradually, and electron donor is added during the treatment. After treatment, spherical carriers are washed with inert solvent for several times, and a solid powdered spherical catalyst is obtained after drying. The molar ratio of titanium tetrachloride to magnesium chloride is from 20 to 200, preferably 30 to 60. The onset treatment temperature is from -30 to 0°C, preferably -25 to -20°C. The final treatment temperature is from 80 to 136°C, preferably 100 to 130°C.

[0031] The obtained spherical catalyst has the following characteristics: the content of titanium is from 1.5 to 3.0wt%, the content of ester is from 6.0 to 20.0wt%, the content of chloride is from 52 to 60wt%, the content of magnesium is from 10 to 20wt%, the content of inert solvent is from 1 to 6wt%, and the specific surface area of catalyst is greater than 250m²/g.

[0032] Method 4: Titanium tetrachloride (TiCl₄) or a solution of titanium tetrachloride (TiCl₄) in arene is used to halogenate magnesium compound, such as dialkoxymagnesium and diaryloxymagnesium. The treatment with titanium tetrachloride (TiCl₄) or the solution of titanium tetrachloride (TiCl₄) in arene can be repeated for one or more times, and said diol diester is added therein during the one or more times of such treatment.

[0033] Method 5: preparing the catalyst component according to US4540697.

[0034] Transition metal compound (preferably tetravalent titanium compound), alkoxymagnesium compound and electron donor react with each other in a certain proportion in inert solvent, wherein the molar ratio of transition metal element to magnesium element is at least 0.5:1, and the amount of electron donor is at most 1.0 mol for each gram of titanium atom. The inert solvent should be removed conveniently, and dehydrated and deoxidated, and be removed from the gas that would enable catalyst being poisoned. The reaction is carried out at a temperature of -10 to 170°C, and the reaction time is from several minutes to several hours.

[0035] The methods for preparing catalyst component further include that, for example, adding magnesium compound and electron donor, etc. in the diluent to form emulsion, adding titanium compound for fixation to obtain spherical solids, and then obtaining a solid catalyst component after treatment.

[0036] Another object of the invention is to provide a catalyst for olefin polymerization, comprising a reaction product

of the following components:

- (1) the above solid catalyst component,
- (2) alkyl aluminium compound, and
- (3) optionally, external electron donor component;

wherein alkyl aluminium compound is the compound with a Formula of $\text{AlR}_n\text{X}_{3-n}$, in which R is hydrogen or hydrocarbyl group having 1 to 20 carbon atoms, X is halogen, and n is a value satisfying $1 \leq n \leq 3$. Specifically, the compound can be selected from triethyl aluminium, tripropyl aluminium, tri(n-butyl) aluminium, tri(isobutyl) aluminium, tri(n-octyl) aluminium, tri(isooctyl) aluminium, diethyl aluminium hydride, di(isobutyl) aluminium hydride, diethyl aluminium chloride, di(isobutyl) aluminium chloride, ethyl aluminium sesquichloride and ethyl aluminium dichloride, and preferably triethyl aluminium and tri(isobutyl) aluminium.

[0037] As to olefin polymer requiring a very high stereoregularity, it needs to add the external electron donor compound as mentioned in component (3), such as an organosilicon compound with a Formula of $\text{R}_n\text{Si}(\text{OR}')_{4-n}$, in which $0 \leq n \leq 3$, and R and R', which may be identical to or different from each other, can be selected from alkyl, cycloalkyl, aryl, halogenated alkyl and amine group, and R can be also halogen or hydrogen atom. For example, they can be selected from trimethyl methoxy silane, trimethyl ethoxy silane, dimethyl dimethoxy silane, dimethyl diethoxy silane, diphenyl dimethoxy silane, diphenyl diethoxy silane, phenyl triethoxy silane, phenyl trimethoxy silane, vinyl trimethoxy silane, cyclohexyl methyl dimethoxy silane and methyl t-butyl dimethoxy silane, preferably cyclohexyl methyl dimethoxy silane and diphenyl dimethoxy silane. As the external electron donor compound, it also can be the ether compound having electron donor group, such as ether compound like 1,3-diether, and /or amino silane compound.

[0038] The ratio of component (1) to component (2) to component (3), calculated as the molar ratio of titanium: aluminium: silicon, is in the range of 1:5-1000:0-500.

[0039] The catalyst of the present invention can be added directly into the reactor for polymerization process. Alternatively, prepolymerization can be conducted with catalyst before the catalyst is added into the first reactor. In the present invention, the term "prepolymerization" refers to polymerized with a low conversion degree. According to the present invention, said prepolymerization catalyst comprises the above solid catalyst and the prepolymer obtained by the prepolymerization of catalyst and olefin, and the prepolymerization multiples is in the range of 0.1 to 1000g olefin polymer per 1g solid catalyst component.

[0040] The α -olefin which is the same as the foregoing olefin can be used for prepolymerization, wherein the olefin for prepolymerization is preferably ethylene or propylene. Specifically, the mixture of ethylene or propylene and one or more α -olefins with a maximum amount of 20mol% is particularly advantageous for prepolymerization. Preferably, the conversion degree of prepolymerized catalyst component is in a range of about 0.2 to about 800g polymer per 1g catalyst component.

[0041] The prepolymerization process can be carried out at a temperature of -40 to 80°C , preferably -20 to 50°C , in liquid or gas phase. The prepolymerization step can be carried out on-line as a part of continuous polymerization process, or independently in intermittent operations. In order to prepare the polymer with an amount of 0.5 to 20g per 1g catalyst component, intermittent prepolymerization of the catalyst according to the present invention and propylene is particularly preferred. The polymerization pressure is from 0.01 to 10MPa.

[0042] The catalyst according to the present invention can be also used to produce polyethylene, and copolymer of ethylene with α -olefin, such as propylene, butylene, pentene, hexene, octene, and 4-methyl-1-pentene.

[0043] It should be noted that in the present invention, by using the catalyst component containing a certain amount of diol diester compound with Fischer projection formula as Formula (II), the activity and stereotactic ability of the catalyst, especially the isotactic index indicated by boiling n-heptane extracted insolubles in the production of polymers with high melt index, are enhanced significantly. At the same time, the hydrogen response of the catalyst is also good, and the molecular weight distribution of the polymer obtained is also wider, all of which is favour for the development of polymers with different MK.

Embodiments

[0044] The present invention will be explained in detail by the following examples. Obviously, these examples do not restrict the scope of the present invention in any manner.

Test methods:

[0045]

1. Measurement of nuclear magnetic resonance: using Bruke dm300 nuclear magnetic resonance spectrometer

for $^1\text{H-NMR}$ (300MHz, solvent is CDCl_3 , TMS as internal standard, and measuring temperature is 300K);

2. Isotactic index of polymer is measured by heptane extraction method (heptane boiling extraction for 6h): 2g dried polymer sample is extracted with boiling heptane in an extractor for 6 hours, then the residual substance is dried to constant weight, and the ratio of the weight (g) of residual polymer to 2 is namely the Isotactic Index;

3. Liquid chromatography is a Waters-600E high performance liquid chromatography with C-18 column, and the column temperature is 30°C . The mobile phase is methol-water with a flow rate of 1.0 ml/min. UV detector, observed at 229 nm.

a) Synthesis of diol diester compound

[0046] The diol with polarimetry activity can be synthesized as disclosed in "Chemistry Letters, 1979, 1049-1050", and then is reacted with corresponding acid or acyl chloride, so that a corresponding diol diester with polarimetry activity can be obtained. It can also be obtained by crystallizing while lowering temperature of the diol mixture in organic solvent such as ether, then reacting with corresponding acid or acyl chloride, see "Bull. Chem. Soc. Jpn., 1980, (53), 3367-3368". Additionally, the diol diester with different conformation isomers can be dissolved in organic solvent like toluene, and then a very pure mixture of the mesomer, levo isomer and dextro isomer can be obtained after several times of recrystallizations by lowering temperature and crystallizing slowly. It should be stated that, as the operation conditions, such as the solvent, reaction temperature, reductant or alkali used in synthesis are different, the proportions of different conformation isomers in the primary diol diester are very different from each other.

1. Preparation of product, which is mainly (2R,4R)-pentanediol dibenzoate (other compounds with R configuration can also be similarly synthesized)

[0047] 20 g (R,R)-Ta (tartaric acid) and 200g NaBr are dissolved in 2000ml deionized water, then NaOH solution is used to adjust the pH of the solution to 3.2 (solution A). It should be noted that for the product mainly being (2S,4S)-pentanediol dibenzoate, (R, R)-Ta should be replaced with (S,S)-Ta; and other compounds with S configuration can also be similarly synthesized. Into the solution 16g Raney Ni is added under stirring, and the solution is heated for 1h at the temperature of 100°C . After cooling, the solution is thrown away, and then the residue is washed with 200ml deionized water to obtain a product. The product obtained is treated repeatedly in solution A twice, and washed with methol and dried, then the catalyst (R,R)-Ta-NaBr-Raney Ni is obtained.

[0048] Into a 100ml stainless steel autoclave, 10g (0.1mol) 2,4-pentane dione, 0.2ml acetic acid, 22ml THF being removed from water, and 0.065mol catalyst (R,R)-Ta-NaBr-Raney Ni are added, and hydrogen is fed in until the pressure is 9.3Mpa, then the mixture is heated to 100°C . The temperature is maintained until the hydrogen pressure in the autoclave is no longer decreased. Then the reaction is over. After the pressure releases, the mixture is filtered. After removal of solvent in filtration, crude product is obtained. With reduced pressure distillation, the product is collected at the temperature between 130 and 132°C and under the pressure of 3KPa. The yield is 91 %.

[0049] 0.05mol (5.1g) of the above-mentioned product is added into 200ml THF, with 0.1mol pyridine being added under stirring and 0.1 mol benzoyl chloride being added dropwise, then a heat-reflux is carried out for 4 h. After cooling, the mixture is dissolved by adding saturated aqueous solution of sodium chloride, then extracted with ethyl acetate. After removal of solvent in the organic layer, column chromatography is carried out with petroleum ether as eluent, then 13.5g white solid is obtained. The yield is 87%.

[0050] The white solid is analyzed by liquid chromatogram. Result shows that there are mainly two peaks. The retention time of one peak is 10.122, and the peak area thereof is 90%; the corresponding product is (2R,4R)-pentanediol dibenzoate. The retention time of the other peak is 12.118, and the peak area thereof is 10%; the corresponding product is meso-2,4-pentanediol dibenzoate.

2. preparation of meso-2,4-pentanediol dibenzoate

(1) synthesis of 2,4-pentanediol dibenzoate mixture (see CN1580034A)

[0051] A mixture of 10g 2,4-pentanedione and 30 ml methol is added into a mixed solution of 2.5g sodium borohydride, 0.1g sodium hydroxide and 25ml water at a temperature of 0 to 10°C . After that, the solvent is removed under reduced pressure, and then a continuous extraction is carried out for 15h with 40ml ethyl acetate. The solvent is removed, and after column chromatography, a colourless liquid of 9.4g 2,4-pentanediol is obtained. The yield is 90%. In the IR spectrogram, a strong absorption peak is observed at 3400cm^{-1} , and no absorption peak is observed at 1700cm^{-1} , which means that the reduction reaction is carried out completely.

[0052] Into 3.1g (0.03mol) 2,4-pentanediol, 30ml THF and 7.1g (0.09mol) pyridine are added, and 10.5g (0.075mol) benzoyl chloride is added under stirring, then a heat-reflux is carried out for 4 h. After cooling, 20 ml saturated salt solution is added, then extraction is carried out with ethyl acetate, and after drying with anhydrous NaSO₄, the solvent is removed. A colourless liquid of 8.9g 2,4-pentanediol dibenzoate is obtained by column chromatography. The yield is 95%.

(2) separation of meso-2,4-pentanediol dibenzoate from the mixture

[0053] 20g mixture of 2,4-pentanediol dibenzoate isomers prepared as above is dissolved in 20ml toluene. With the temperature being lowered slowly, white crystals are precipitated slowly in the solution. The crystals are separated, and recrystallized in toluene for several times. The liquid chromatogram of the obtained crystals reveals that, the retention time is 12.108, and the peak area is 99.0%.

[0054] Meso-2,4-pentanediol dibenzoate, ¹H-NMR (TMS, CDCl₃, ppm): δ 1.40-1.42 (6H, d, CH₃), δ 1.87-1.95 (1H, m, CH₂), δ 2.29-2.39 (1H, m, CH₂), δ 5.28-5.39 (2H, m, CH of ester), δ 7.38-8.04 (10H, m, C₆H₆).

[0055] (2R,4R)-pentanediol dibenzoate and (2S,4S)-pentanediol dibenzoate, ¹H-NMR (TMS, CDCl₃, ppm): δ 1.40-1.42 (6H, d, CH₃), δ 2.08-2.12 (2H, t, CH₂), δ 5.26-5.37 (2H, m, CH of ester), δ 7.35-7.99 (10H, m, C₆H₆).

[0056] The diol diester added in the preparation of catalyst meets the requirements in the following examples by adjustment of the amount of each purer isomer obtained by the above processes. The adding method of the diol diester is conventional in chemistry: weighing out each isomer (such as levo-, dextro- and meso-2,4-pentanediol dibenzoate) according to a certain proportion, and after mixing, adding the mixture to prepare catalyst; analysing the content of each isomer in the prepared catalyst; if the content of each isomer in the catalyst does not meet the requirement, changing the adding proportion of isomers as appropriate, but keeping the total amount unchanged. The analysis for the electron donor content in the catalyst comprises the following steps: carrier destruction by dilute hydrochloric acid, extraction of electron donor by ethyl acetate, and analysis by liquid chromatogram.

b) Preparation of solid catalyst component

Preparation method A of solid catalyst component

[0057] Preparation method A corresponds to Method 1 of said solid catalyst component as mentioned above. Under nitrogen atmosphere, 4.8g anhydrous magnesium chloride, 19.5g isooctyl alcohol, and 19.5g decane as solvent are added into a 500ml reactor which is provided with stirrers. Being heated to 130°C, the reaction is carried out for 1.5h until magnesium chloride is dissolved completely. Then 1.1g phthalic anhydride is added, and the reaction is continued for 1h with the temperature kept at 130°C. Alcohol adduct is obtained and then it is cooled to room temperature.

[0058] Under nitrogen atmosphere, the above alcohol adduct is added dropwise into 120ml solution of titanium tetrachloride which is pre-cooled to -22°C. Being heated to 100°C slowly, 10mmol diol diester compound is added. Then, being heated to 110°C which is kept for 2h, the mixture is filtered while hot. Another 120ml solution of titanium tetrachloride is added, and then the reaction is carried out for 1h after being heated to 110°C. After filtration, the solid particulates are washed with anhydrous hexane for 4 times and then dried. Then a solid catalyst component is obtained.

Preparation method B of solid catalyst component

[0059] Preparation method B corresponds to Method 2 of said solid catalyst component as mentioned above. Into the reactor, in which air is fully replaced by high purity nitrogen, 6.0g magnesium chloride, 119ml toluene, 5ml epichlorohydrin and 15.6ml tributyl phosphate (TBP) are added in sequence. Being heated to 50°C under stirring and the temperature being kept for 2.5h, the solid is dissolved completely. Then 1.7g phthalic anhydride is added, and the temperature is further kept for 1h. After cooling the solution to below -25°C, 70ml TiCl₄ is added dropwise within 1h. The temperature is slowly increased to 80°C, during which the solid is precipitated slowly. 6mmol diol diester compound is added, and the temperature is kept for 1h. After filtration, 80ml toluene is added, then solid precipitate is obtained after being washed twice.

[0060] Then 60ml toluene and 40ml TiCl₄ are added. Being heated to 100°C, the treatment is carried out for 2h and the filtrate is exhausted. After repeating the above operation for one time, another 60ml toluene is added, and the filter residual is washed for 3 times in boiling state. Then 60ml hexane is added, and the filter residual is washed for 2 times in boiling state. Then another 60ml hexane is added, and the filter residual is washed for 2 times at room temperature. The catalyst component is obtained.

Preparation method C of solid catalyst component

[0061] Preparation method C corresponds to Method 3 of said solid catalyst component as mentioned above. In a 250ml reactor, which is provided with a reflux condenser, a mechanical stirrer and a thermometer, and in which air is fully replaced by nitrogen, 36.5ml anhydrous ethanol and 21.3g anhydrous magnesium chloride are added. Under heating and stirring, after magnesium chloride dissolved completely, 75ml white oil and 75ml silicone oil are added, and the temperature is kept at 120°C for a certain time. In another 500ml reactor equipped with high speed stirrers, 112.5ml white oil and 112.5ml silicone oil are added in advance, and it is preheated to 120°C. The above mixture is fed rapidly into the second reactor, and a stirring is carried out at a speed of 3500 rpm for 3min with the temperature kept at 120°C. Under stirring, the materials are transferred into a third reactor which is cooled to -25°C and filled with 1600ml hexane in advance. Until the transfer of materials is completed, the final temperature is no more than 0°C. After vacuum filtration, the filter residual is washed with hexane and dried under vacuum, obtaining 41g spherical particulates magnesium chloride alcohol adduct. The carrier with 100 to 400 mesh is selected after sieving, and the ingredient of the carrier is $\text{MgCl}_2 \cdot 2.38\text{C}_2\text{H}_5\text{OH}$ by analysis and test.

[0062] 7g above spherical carrier of $\text{MgCl}_2 \cdot 2.38\text{C}_2\text{H}_5\text{OH}$ is added slowly into a reactor which contains 150ml TiCl_4 and is pre-cooled to -20°C. After being slowly heated to 40°C, 5mmol diol diester compound is added. After continuously being heated until 130°C and the temperature being kept for 2h, vacuum filtration is carried out. Another 120ml TiCl_4 is added. After being slowly heated to 130°C and the temperature being kept for 2h, washing is carried out with 60ml hexane for several times, until no chloridion is observed in the filtration. The filter cake is dried under vacuum, obtaining the solid catalyst component.

c) Test of polymerization of propylene

[0063] The catalyst components of the above examples are used to polymerize propylene respectively. The propylene polymerization process is as follows. Into a 5L stainless steel reactor in which air is replaced fully with gas propylene, 2.5mmol AlEt_3 and 0.1mmol cyclohexyl methyl dimethoxy silane (CHMMS) are added, then 8 to 10 mg catalyst component of as above and 1.2L hydrogen are added, after feeding 2.3L liquid propylene, the temperature is increased to 70°C and kept for 1h. After cooling and pressure release, PP powders of Examples 1 to 10 and Comparative Examples 1 to 5 are obtained.

Table 1 Results of propylene polymerization

Num.	Electron donor	Preparation process for catalyst	Fischer projection formula(II) content wt%	Polymerization activity kgPP/gcat	Isotactic index %
Example 1	2,4-pentanediol dibenzoate	A	35.0	35.1	98.1
Example 2	2,4-pentanediol dibenzoate	A	51.0	39.5	98.8
Example 3	2,4-pentanediol dibenzoate	A	95.1	42.3	98.9
Comparative Example 1*	2,4-pentanediol dibenzoate	A	0	17.6	92.1
Comparative Example 2*	2,4-pentanediol dibenzoate	A	0	17.0	91.9
Comparative Example 3	2,4-pentanediol dibenzoate	A	20.5	26.3	97.0
Example 4	3,5-heptanediol dibenzoate	B	98.9	59.6	98.6
Comparative Example 4*	3,5-heptanediol dibenzoate	B	0	17.9	89.3
Example 5	3,5-heptanediol di(p-methylbenzoate)	B	96.9	60.5	98.8

(continued)

Num.	Electron donor	Preparation process for catalyst	Fischer projection formula(II) content wt%	Polymerization activity kgPP/gcat	Isotactic index %
Example 6	4-ethyl-3,5-heptanediol dibenzoate	B	96.5	61.8	97.9
Example 7	2,4-pentanediol di(p-chlorobenzoate)	B	60.0	51.2	98.5
Example 8	2,4-pentanediol dibenzoate	C	81.0	67.6	99.1
Example 9	3,5-heptanediol di(p-butylbenzoate)	A	82.4	45.2	98.6
Example 10	6-methyl-2,4-heptanediol di(p-butyl benzoate)	A	78.6	42.9	97.8
Comparative example 5	6-methyl-2,4-heptanediol di(p-butyl benzoate)	A	25.0	22.8	95.3
Note: In the catalyst preparation of comparative examples 1*, 2* and 4*, levo isomer, racemate and dextro isomer are added respectively. In other comparative examples and examples, besides diol diester with Fischer projection formula (II), other diol diester compounds can be levo isomer, dextro isomer or mixture thereof.					

[0064] It can be seen from Table 1 that, when the content of diol diester with Fischer projection formula (II) is from 35 to 96.9wt%, the catalyst activity is from 35.1 to 67.6 kgPP/gcat, and the isotactic index is from 97.8 to 99.1%; when the content of diol diester with Fischer projection formula (II) is from 0 to 25.0wt%, the catalyst activity is from 17.0 to 26.3 kgPP/gcat, and the isotactic index is from 89.3 to 97.0%. Therefore, only when the content of diol diester with Fischer projection formula (II) is greater than 35wt%, the catalyst has good performances, and when the content is greater than 51 %, the catalyst has excellent comprehensive properties.

[0065] The catalysts used in the above Examples and Comparative Examples are used to polymerize propylene. The conditions are the same as the foregoing polymerization reactions, except the amount of hydrogen added is changed from 1.2 L to 8.0L. The results are shown in Table 2.

Table 2 Effect of the content of Fischer projection formula (II) on the isotactic index of PP under high hydrogen concentration

catalyst	Fischer projection formula(II) content wt%	Polymerization activity (kgPP/gcat)		Melt index (g/10min)		Isotactic index (%)	
		1.2L hydrogen	8L hydrogen	1.2L hydrogen	8L hydrogen	1.2L hydrogen	8L hydrogen
Example 1	35.0	35.1	43.5	0.8	21.3	98.1	96.0
Example 2	51.0	39.5	46.8	0.6	20.9	98.8	97.6
Comparative example 3	20.5	26.3	28.9	1.0	25.5	97.0	91.9

[0066] It can be seen from Table 2 that, the content of diol diester with Fischer projection formula (II) has a great influence on the isotactic index of the obtained polymer under high hydrogen concentration; only when the content of diol diester with Fischer projection formula (II) is greater than or equal to 35wt%, it is ensured that the polymer can still have a high isotactic index under a high melt index (greater than 95%).

[0067] During the preparation of catalyst component, other electron donors can be introduced. Through complex formulation of such electron donor and the diol diester with the content of diol diester with Fischer projection formula (II) greater than or equal to 35wt%, catalyst with high activity can be prepared. The particular can be found in the following Examples.

Example 11

[0068] Example 11 is similar to Example 4. However, in Example 4 "60ml toluene and 40ml TiCl_4 are added, being heated to 100°C , the treatment is carried out for 2h and the filtrate is exhausted, then repeating the above operation for one time"; but in Example 11 "0.2mmol di(n-butyl) phthalate, 60ml toluene and 40ml TiCl_4 are added, being heated to 110°C , the treatment is carried out for 2h and the filtrate is exhausted". Then the treatment with 60ml toluene and 40ml TiCl_4 for 0.5h under 110°C is repeated for three times. The obtained catalyst contains 7.9% 3,5-heptanediol dibenzoate, in which the mesomer content is 97.9%, and 0.9% di(n-butyl) phthalate. The catalyst activity is 68.6 kgPP/g cat., and the isotactic index of polymer is 98.8%.

[0069] With 9.6L hydrogen added, the melt index of the obtained polymer is 59.6g/10min, and the isotactic index thereof is 95.8%.

Example 12

[0070] Example 12 is similar to Example 6. However, in Example 12 0.4mmol 2-isopropyl-2-isopentyl-1,3-dimethoxyl propane is also added at the first adding of 60ml toluene and 40 ml TiCl_4 . The obtained catalyst contains 12.1% 4-ethyl-3,5-heptanediol dibenzoate, in which the mesomer content is 96.9%, and 2.8% 2-isopropyl-2-isopentyl-1,3-dimethoxyl propane. The catalyst activity is 69.1 kgPP/gcat, and the isotactic index of polymer is 98.9%.

[0071] With hydrogen 9.6L added, the melt index of the obtained polymer is 71.5g/10min, and the isotactic index of the obtained polymer is 95.5%.

Example 13

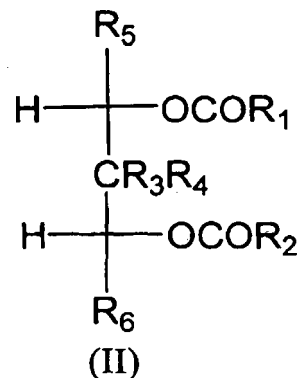
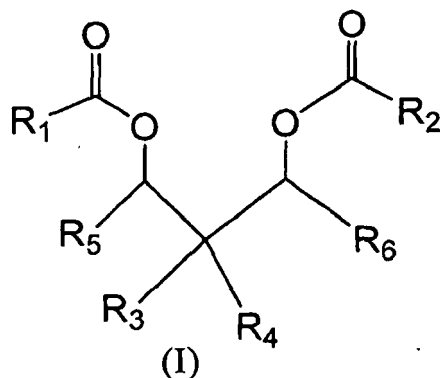
[0072] Example 13 is similar to Example 4. However, 6mmol diol diester is added in Example 4, while 3mmol diol diester and 3mmol 9,9-di(methoxymethyl) fluorene are added in Example 13. The obtained catalyst contains 5.2% 3,5-heptanediol dibenzoate, in which the mesomer content is 98.9%, and 5.3% 9,9-di(methoxymethyl) fluorene. The catalyst activity is 75.9 kgPP/gcat, and the isotactic index of polymer is 98.8%.

[0073] It can be seen from the above examples that, by the complex formulation of the diol diester compound with Fischer projection formula (II) structure and other inner electron donors, not only the catalyst activity is enhanced significantly, but also the isotactic index of the obtained polymer is further increased.

[0074] The foregoing examples are merely the preferred embodiments of the present invention. However, the protection scope of the present invention is not limited to the disclosure. One skilled in the art can easily make any changes or variation based on the disclosure of the present invention, and the changes or variations are within the protection scope of the present invention. Therefore, the protection scope of the present invention should be determined by the appended claims.

Claims

1. A catalyst component for olefin polymerization, comprising magnesium, titanium, halogen and electron donor, wherein the electron donor is selected from at least one of the diol diester compounds as shown in Formula (I), and in said diol diester compounds as shown in Formula (I), the content of the diol diester compound with Fischer projection formula as shown in Formula (II) is greater than or equal to 35wt%:



in both Formula (I) and Formula (II):

R_1 and R_2 , which may be identical to or different from each other, can be (C₃-C₂₀) cycloalkyl, (C₆-C₂₀) aryl or (C₇-C₂₀) alkaryl or aralkyl group, and the hydrogen atom bound to the carbon atom in said cycloalkyl, aryl, alkaryl or aralkyl group can be optionally substituted by halogen atom, but R_1 and R_2 cannot be (C₃-C₂₀) cycloalkyl simultaneously;

R_3 and R_4 , which may be identical to or different from each other, can be hydrogen atom, halogen atom, (C₁-C₁₀) straight chain alkyl, (C₃-C₁₀) branched chain alkyl, (C₃-C₁₀) cycloalkyl, (C₆-C₁₀) aryl or (C₇-C₁₀) alkaryl or aralkyl, and R_3 and R_4 can be optionally bonded together to form ring; and

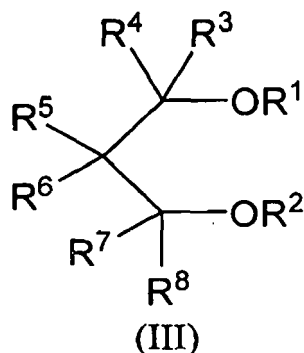
R_5 and R_6 , which may be identical to or different from each other, can be halogen atom, (C₁-C₁₀) straight chain alkyl, (C₃-C₁₀) branched chain alkyl, (C₃-C₁₀) cycloalkyl, (C₆-C₁₀) aryl or (C₇-C₁₀) alkaryl or aralkyl, and the hydrogen atom bound to the carbon atom in said cycloalkyl, aryl, alkaryl or aralkyl can be optionally substituted by halogen atom.

2. A catalyst component for olefin polymerization according to claim 1, wherein in said diol diester compound as shown in Formula (I), the content of the diol diester compound with Fischer projection formula as shown in Formula (II) is greater than or equal to 51wt%, preferably greater than or equal to 60wt%, further preferably greater than or equal to 80wt%.
3. A catalyst component for olefin polymerization according to claim 1, wherein R_1 and R_2 groups are individually selected from (C₆-C₂₀) aryl, (C₇-C₂₀) alkaryl, and (C₇-C₂₀) aralkyl group, and the hydrogen atom in said groups can be optionally substituted by halogen atom, preferably R_1 and R_2 groups are individually selected from phenyl, (C₁-C₅) alkyl phenyl, halogenated phenyl, halogenated (C₁-C₅) alkyl phenyl, indenyl, benzyl and phenethyl group, further preferably R_1 group is the same as R_2 group.
4. A catalyst component for olefin polymerization according to claim 1, wherein R_3 and R_4 groups are selected from hydrogen, methyl, ethyl, n-propyl, isopropyl, n-butyl, isobutyl, chloro and bromo group.
5. A catalyst component for olefin polymerization according to claim 1, wherein R_5 and R_6 groups are selected from methyl, ethyl, n-propyl, isopropyl, n-butyl and isobutyl group, or the hydrogen atom in said alkyl group can be substituted by halogen atom.
6. A catalyst component for olefin polymerization according to claim 1, wherein the compounds with Fisher projection formula as Formula (II) are selected from the followings:

meso-2,4-pentanediol dibenzoate,
 meso-3-methyl-2,4-pentanediol dibenzoate,
 meso-3-ethyl-2,4-pentanediol dibenzoate,
 meso-3-propyl-2,4-pentanediol dibenzoate,
 meso-3-butyl-2,4-pentanediol dibenzoate,
 meso-3,3-dimethyl-2,4-pentanediol dibenzoate,
 meso-2,4-pentanediol di(p-methylbenzoate),
 meso-3-chloro-2,4-pentanediol dibenzoate,
 meso-3-bromo-2,4-pentanediol dibenzoate,
 meso-2,4-pentanediol di(m-methylbenzoate),
 meso-2,4-pentanediol di(o-methylbenzoate),
 meso-2,4-pentanediol di(p-ethylbenzoate),
 meso-2,4-pentanediol di(p-butylbenzoate),
 meso-2,4-pentanediol di(p-chlorobenzoate),
 meso-3,5-heptanediol dibenzoate,
 meso-4-methyl-3,5-heptanediol dibenzoate,
 meso-4-dimethyl-3,5-heptanediol dibenzoate,
 meso-4-ethyl-3,5-heptanediol dibenzoate,
 meso-4-propyl-3,5-heptanediol dibenzoate,
 meso-4-butyl-3,5-heptanediol dibenzoate,
 meso-4-chloro-3,5-heptanediol dibenzoate,
 meso-4-bromo-3,5-heptanediol dibenzoate,
 meso-3,5-heptanediol di(p-methylbenzoate),

meso-3,5-heptanediol di(o-methylbenzoate),
 meso-3,5-heptanediol di(m-methylbenzoate),
 meso-3,5-heptanediol di(p-ethylbenzoate),
 meso-3,5-heptanediol di(p-butylbenzoate),
 meso-3,5-heptanediol di(p-chlorobenzoate),
 (2S,4R)-2,4-pentanediol benzoxy cinnamate,
 (2S,4R)-3-methyl-2,4-pentanediol benzoxy cinnamate,
 (2S,4R)-3-ethyl-2,4-pentanediol benzoxy cinnamate,
 (2S,4R)-3-propyl-2,4-pentanediol benzoxy cinnamate,
 (2S,4R)-3-butyl-2,4-pentanediol benzoxy cinnamate,
 (2S,4R)-3,3-dimethyl-2,4-pentanediol benzoxy cinnamate,
 (2S,4R)-3-chloro-2,4-pentanediol dibenzoate,
 (3S,5R)-3,5-heptanediol benzoxy cinnamate,
 (3S,5R)-4-methyl-3,5-heptanediol benzoxy cinnamate,
 (3S,5R)-4,4-dimethyl-3,5-heptanediol benzoxy cinnamate,
 (3S,5R)-4-ethyl-3,5-heptanediol benzoxy cinnamate,
 (3S,5R)-4-propyl-3,5-heptanediol benzoxy cinnamate,
 (3S,5R)-4-butyl-3,5-heptanediol benzoxy cinnamate,
 (3S,5R)-4-chloro-3,5-heptanediol benzoxy cinnamate,
 (2S,4R)-6-methyl-2,4-heptanediol dibenzoate,
 (2S,4R)-6-methyl-2,4-heptanediol di(p-butyl benzoate),
 (2R,4S)-2,4-pentanediol benzoxy cinnamate,
 (2R,4S)-3-methyl-2,4-pentanediol benzoxy cinnamate,
 (2R,4S)-3-ethyl-2,4-pentanediol benzoxy cinnamate,
 (2R,4S)-3-propyl-2,4-pentanediol benzoxy cinnamate,
 (2R,4S)-3-butyl-2,4-pentanediol benzoxy cinnamate,
 (2R,4S)-3,3-dimethyl-2,4-pentanediol benzoxy cinnamate,
 (2R,4S)-3-chloro-2,4-pentanediol dibenzoate,
 (3R,5S)-3,5-heptanediol benzoxy cinnamate,
 (3R,5S)-4-methyl-3,5-heptanediol benzoxy cinnamate,
 (3R,5S)-4,4-dimethyl-3,5-heptanediol benzoxy cinnamate,
 (3R,5S)-4-ethyl-3,5-heptanediol benzoxy cinnamate,
 (3R,5S)-4-propyl-3,5-heptanediol benzoxy cinnamate,
 (3R,5S)-4-butyl-3,5-heptanediol benzoxy cinnamate,
 (3R,5S)-4-chloro-3,5-heptanediol benzoxy cinnamate,
 (2R,4S)-6-methyl-2,4-heptanediol dibenzoate,
 (2R,4S)-6-methyl-2,4-heptanediol di(p-butyl benzoate).

7. A catalyst component for olefin polymerization according to claim 1, in which said electron donor diol diester compound is marked as "a", and the catalyst component further contains an electron donor "b", wherein "b" is phthalate diester compound or diether compound as shown in Formula (III), and the molar ratio of "a" to "b" is from 1:0.01 to 1:100:



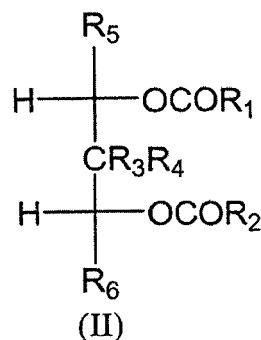
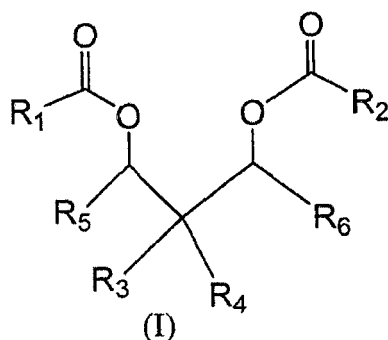
in Formula (III), R¹ and R², which may be identical to or different from each other, can be selected from straight

chain or branched chain (C_1-C_{20}) alkyl and (C_3-C_{20}) cycloalkyl group; R^3-R^8 , which may be identical to or different from each other, can be selected from hydrogen atom, halogen atom, straight chain or branched chain (C_1-C_{20}) alkyl, (C_3-C_{20}) cycloalkyl, (C_6-C_{20}) aryl and (C_7-C_{20}) aralkyl, and the R^3-R^8 groups can be optionally bonded together to form ring.

8. A catalyst component for olefin polymerization according to claim 7, wherein the molar ratio of "a" to "b" is from 1:0.02 to 1:5.
9. A catalyst component for olefin polymerization according to claim 1, obtained by reaction of magnesium compound, titanium compound and said diol diester compound, wherein titanium compound is as shown in Formula of $TiX_n(OR)_{4-n}$, in which R is hydrocarbyl group having 1 to 20 carbon atoms, X is halogen, and $n=0-4$; and wherein magnesium compound is selected from magnesium dihalide, alkoxymagnesium, alkyl magnesium, hydrate or alcohol adduct of magnesium dihalide, and the derivatives formed by replacing a halogen atom of the magnesium dihalide with alkoxyl or haloalkoxyl group.
10. A catalyst component for olefin polymerization according to claim 9, wherein the magnesium compound used is dissolved in a solvent system containing organic alcohol compound.
11. A catalyst component for olefin polymerization according to claim 10, wherein the organic alcohol compound comprises monohydric alcohol with the carbon atoms of 2 to 8.
12. A catalyst component for olefin polymerization according to claim 9, wherein the magnesium compound used is alcohol adduct of magnesium dihalide.
13. A catalyst component for olefin polymerization according to claim 9, wherein the magnesium compound is dissolved in a solvent system containing organic epoxy compound and organic phosphorus compound, in which the organic epoxy compound comprises aliphatic olefins, dienes, halogenated aliphatic olefins, oxides of dienes, glycidyl ethers and inner ethers, all of which have 2 to 8 carbon atoms, and the organic phosphorus compound is hydrocarbyl ester or halogenated hydrocarbyl ester of orthophosphoric acid or phosphorous acid.
14. A catalyst for olefin polymerization, comprising the following components:
 - 1) said catalyst component according to claim 1,
 - 2) alkyl aluminium compound,
 - 3) optionally, external electron donor component.
15. A catalyst according to claim 14, wherein the external electron donor compound is as shown in Formula of $R_nSi(OR')_{4-n}$, wherein $0 \leq n \leq 3$, R and R', which may be identical to or different from each other, can be selected from alkyl, cycloalkyl, aryl, halogenated alkyl and amine group, and R can be also halogen or hydrogen atom.
16. A prepolymerized catalyst for olefin polymerization, comprising a solid catalyst according to claim 14 and the prepolymer obtained by the prepolymerization of the solid catalyst according to claim 14 and the olefin, the prepolymerization multiples being in the range of 0.1 to 1000g olefin polymer per g solid catalyst component.
17. A prepolymerized catalyst according to claim 16, wherein the olefin to be prepolymerized is ethylene or propylene.
18. A process for olefin polymerization carried out at the presence of said catalyst component according to claim 1, said catalyst according to claim 14, or the prepolymerized catalyst according to claim 16.

Patentansprüche

1. Katalysatorkomponente für die Olefinpolymerisation, umfassend Magnesium, Titan, Halogen und Elektronendonator, worin der Elektronendonator ausgewählt ist aus zumindest einer der Dioldiesterverbindungen, gezeigt in Formel (I), und worin in den Dioldiesterverbindungen, dargestellt in der Formel (I), der Gehalt der Dioldiesterverbindung mit einer Fischer-Projektionsformel gemäß Formel (II) größer als oder gleich 35 Gew.-% ist:



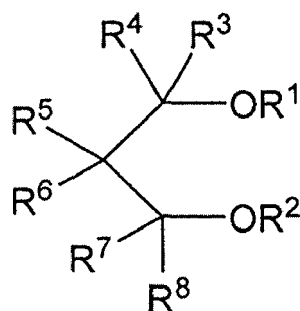
worin in den Formeln (I) und (II):

- R₁ und R₂, die identisch oder verschieden voneinander sein können, (C₃-C₂₀)-Cycloalkyl, (C₆-C₂₀)-Aryl oder (C₇-C₂₀)-Alkaryl oder -Aralkylgruppe sein können und das Wasserstoffatom, das an das Kohlenstoffatom in der Cycloalkyl-, Aryl-, Alkaryl- oder Aralkylgruppe gebunden ist, wahlweise durch Halogenatom substituiert sein kann, aber R₁ und R₂ nicht gleichzeitig (C₃-C₂₀)-Cycloalkyl sein können;
 - R₃ und R₄, die identisch oder verschieden voneinander sein können, Wasserstoff, Halogenatom, geradkettiges (C₁-C₁₀)-Alkyl, verzweigtes (C₃-C₁₀)-Alkyl, (C₃-C₁₀)-Cycloalkyl, (C₆-C₁₀)-Aryl oder (C₇-C₁₀)-Alkaryl oder -Aralkyl sein können und R₃ und R₄ wahlweise zusammen zur Bildung eines Rings gebunden sein können, und
 - R₅ und R₆, die identisch oder verschieden voneinander sein können, Wasserstoffatom, geradkettiges (C₁-C₁₀)-Alkyl, verzweigtes (C₃-C₁₀)-Alkyl, (C₃-C₁₀)-Cycloalkyl, (C₆-C₁₀)-Aryl oder (C₇-C₁₀)-Alkaryl oder -Aralkyl sein können und das Wasserstoffatom, das an das Kohlenstoffatom im Cycloalkyl, Aryl, Alkaryl oder Aralkyl gebunden ist, wahlweise durch Halogenatom substituiert sein kann.
2. Katalysatorkomponente für die Olefinpolymerisation nach Anspruch 1, worin in der Dioldiesterverbindung gemäß Formel (I) der Gehalt der Dioldiesterverbindung mit einer Fischer-Projektionsformel gemäß Formel (II) größer als oder gleich 51 Gew.-%, bevorzugt größer als oder gleich 60 Gew.-%, weiter bevorzugt größer als oder gleich 80 Gew.-% ist.
 3. Katalysatorkomponente für die Olefinpolymerisation nach Anspruch 1, worin die R₁- und R₂-Gruppen individuell ausgewählt sind aus (C₆-C₂₀)-Aryl-, (C₇-C₂₀)-Alkaryl- und (C₇-C₂₀)-Aralkylgruppen und das Wasserstoffatom in den Gruppen wahlweise durch Halogenatom substituiert sein kann, bevorzugt die R₁- und R₂-Gruppen individuell ausgewählt sind aus Phenyl-, (C₁-C₅)-Alkylphenyl-, halogener Phenyl-, halogener (C₁-C₅)-Alkylphenyl-, Indenyl-, Benzyl- und Phenethylgruppe, weiterhin bevorzugt die R₁-Gruppe gleich ist wie die R₂-Gruppe.
 4. Katalysatorkomponente für die Olefinpolymerisation nach Anspruch 1, worin die Gruppen R₃ und R₄ ausgewählt sind aus Wasserstoff, Methyl-, Ethyl-, n-Propyl-, Isopropyl-, n-Butyl-, Isobutyl-, Chlor- und Bromgruppen.
 5. Katalysatorkomponente für die Olefinpolymerisation nach Anspruch 1, worin die Gruppen R₅ und R₆ ausgewählt sind aus Methyl, Ethyl, n-Propyl, Isopropyl, n-Butyl und Isobutyl oder das Wasserstoffatom in der Alkylgruppe durch Halogenatom substituiert sein kann.
 6. Katalysatorkomponente für die Olefinpolymerisation nach Anspruch 1, worin die Verbindungen mit der Fischer-Projektionsformel gemäß Formel (II) ausgewählt sind aus den folgenden:

meso-2,4-Pentandioldibenzoat,
 meso-3-Methyl-2,4-pentandioldibenzoat,
 meso-3-Ethyl-2,4-pentandioldibenzoat,
 meso-3-Propyl-2,4-pentandioldibenzoat,
 meso-3-Butyl-2,4-pentandioldibenzoat,
 meso-3,3-Dimethyl-2,4-pentandioldibenzoat,
 meso-2,4-Pentandioldi(p-methylbenzoat),
 meso-3-Chloro-2,4-pentandioldibenzoat,
 meso-3-Bromo-2,4-pentandioldibenzoat,
 meso-2,4-Pentandioldi(m-methylbenzoat),

meso-2,4-Pentandioldi(o-methylbenzoat),
 meso-2,4-Pentandioldi(p-ethylbenzoat),
 meso-2,4-Pentandioldi(p-butylbenzoat),
 meso-2,4-Pentandioldi(p-chlorobenzoat),
 meso-3,5-Heptandioldibenzoat,
 meso-4-Methyl-3,5-heptandioldibenzoat,
 meso-4-Dimethyl-3,5-heptandioldibenzoat,
 meso-4-Ethyl-3,5-heptandioldibenzoat,
 meso-4-Propyl-3,5-heptandioldibenzoat,
 meso-4-Butyl-3,5-heptandioldibenzoat,
 meso-4-Chloro-3,5-heptandioldibenzoat,
 meso-4-Bromo-3,5-heptandioldibenzoat,
 meso-3,5-Heptandioldi(p-methylbenzoat),
 meso-3,5-Heptandioldi(o-methylbenzoat),
 meso-3,5-Heptandioldi(m-methylbenzoat),
 meso-3,5-Heptandioldi(p-ethylbenzoat),
 meso-3,5-Heptandioldi(p-butylbenzoat),
 meso-3,5-Heptandioldi(p-chlorobenzoat),
 (2S,4R)-2,4-Pentandiolbenzoxycinnamat,
 (2S,4R)-3-Methyl-2,4-pentandiolbenzoxycinnamat,
 (2S,4R)-3-Ethyl-2,4-pentandiolbenzoxycinnamat,
 (2S,4R)-3-Propyl-2,4-pentandiolbenzoxycinnamat,
 (2S,4R)-3-Butyl-2,4-pentandiolbenzoxycinnamat,
 (2S,4R)-3,3-Dimethyl-2,4-pentandiolbenzoxycinnamat,
 (2S,4R)-3-Chloro-2,4-pentandioldibenzoat,
 (3S,5R)-3,5-Heptandiolbenzoxycinnamat,
 (3S,5R)-4-Methyl-3,5-heptandiolbenzoxycinnamat,
 (3S,5R)-4,4-Dimethyl-3,5-heptandiolbenzoxycinnamat,
 (3S,5R)-4-Ethyl-3,5-heptandiolbenzoxycinnamat,
 (3S,5R)-4-Propyl-3,5-heptandiolbenzoxycinnamat,
 (3S,5R)-4-Butyl-3,5-heptandiolbenzoxycinnamat,
 (3S,5R)-4-Chloro-3,5-heptandiolbenzoxycinnamat,
 (2S,4R)-6-Methyl-2,4-heptandioldibenzoat,
 (2S,4R)-6-Methyl-2,4-heptandioldi(p-butylbenzoat),
 (2R,4S)-2,4-Pentandiolbenzoxycinnamat,
 (2R,4S)-3-Methyl-2,4-pentandiolbenzoxycinnamat,
 (2R,4S)-3-Ethyl-2,4-pentandiolbenzoxycinnamat,
 (2R,4S)-3-Propyl-2,4-pentandiolbenzoxycinnamat,
 (2R,4S)-3-Butyl-2,4-pentandiolbenzoxycinnamat,
 (2R,4S)-3,3-Dimethyl-2,4-pentandiolbenzoxycinnamat,
 (2R,4S)-3-Chloro-2,4-pentandioldibenzoat,
 (3R,5S)-3,5-Heptandiolbenzoxycinnamat,
 (3R,5S)-4-Methyl-3,5-heptandiolbenzoxycinnamat,
 (3R,5S)-4,4-Dimethyl-3,5-heptandiolbenzoxycinnamat,
 (3R,5S)-4-Ethyl-3,5-heptandiolbenzoxycinnamat,
 (3R,5S)-4-Propyl-3,5-heptandiolbenzoxycinnamat,
 (3R,5S)-4-Butyl-3,5-heptandiolbenzoxycinnamat,
 (3R,5S)-4-Chloro-3,5-heptandiolbenzoxycinnamat,
 (2R,4S)-6-Methyl-2,4-heptandioldibenzoat,
 (2R,4S)-6-Methyl-2,4-heptandioldi(p-butylbenzoat).

7. Katalysatorkomponente für die Olefinpolymerisation nach Anspruch 1, worin die Elektronendonordioldiester-
 Verbindung mit "a" markiert ist und die Katalysatorkomponente weiterhin einen Elektronendonordioldiester-
 Verbindung mit der Formel (III) ist und das molare Verhältnis "a" zu "b"
 von 1 : 0,01 bis 1 : 100 ist:



(III)

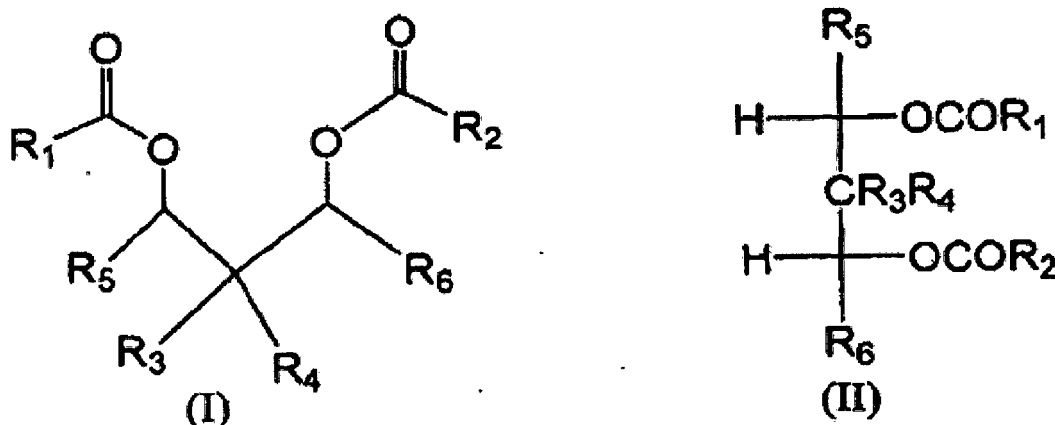
worin in der Formel (III) R^1 und R^2 , die identisch oder verschieden voneinander sein können, ausgewählt sein können aus einer geradkettigen oder verzweigten (C_1 - C_{20})-Alkyl- und (C_3 - C_{20})-Cycloalkylgruppe, R^3 bis R^8 , die identisch oder verschieden voneinander sein können, ausgewählt sein können aus Wasserstoffatom, Halogenatom, geradkettigem oder verzweigtem (C_1 - C_{20})-Alkyl, (C_3 - C_{20})-Cycloalkyl, (C_6 - C_{20})-Aryl und (C_7 - C_{20})-Aralkyl und die Gruppen R^3 bis R^8 wahlweise aneinander zur Bildung eines Rings gebunden sein können.

8. Katalysatorkomponente für die Olefinpolymerisation nach Anspruch 7, worin das molare Verhältnis "a" zu "b" von 1 : 0,02 bis 1 : 5 ist.
9. Katalysatorkomponente für die Olefinpolymerisation nach Anspruch 1, erhalten durch Reaktion einer Magnesiumverbindung, Titanverbindung und der Dioldiesterverbindung, worin die Titanverbindung durch die Formel $TiX_n(OR)_{4-n}$ dargestellt ist, worin R eine Kohlenwasserstoffgruppe mit 1 bis 20 Kohlenstoffatomen, X Halogen und n 0 bis 4 ist, und worin die Magnesiumverbindung ausgewählt ist aus Magnesiumdihalogenid, Alkoxy-magnesium, Alkylmagnesium, Hydrat oder Alkoholaddukt von Magnesiumdihalogenid und den Derivation, gebildet durch Ersetzen eines Halogenatoms des Magnesiumdihalogenides mit Alkoxy- oder Haloalkoxygruppe.
10. Katalysatorkomponente für die Olefinpolymerisation nach Anspruch 9, worin die verwendete Magnesiumverbindung in einem Lösungsmittelsystem mit einer organischen Alkoholverbindung aufgelöst ist.
11. Katalysatorkomponente für die Olefinpolymerisation nach Anspruch 10, worin die organische Alkoholverbindung einen einwertigen Alkohol mit 2 bis 8 Kohlenstoffatomen enthält.
12. Katalysatorkomponente für die Olefinpolymerisation nach Anspruch 9, worin die verwendete Magnesiumverbindung ein Alkoholaddukt von Magnesiumdihalogenid ist.
13. Katalysatorkomponente für die Olefinpolymerisation nach Anspruch 9, worin die Magnesiumverbindung in einem Lösungsmittelsystem aufgelöst ist, umfassend eine organische Epoxyverbindung und organische Phosphorverbindung, worin die organische Epoxyverbindung aliphatische Olefine, Diene, halogenierte aliphatische Olefine, Oxide von Dienen, Glycidylether und innere Ether enthält, die alle 2 bis 8 Kohlenstoffatome haben, und die organische Phosphorverbindung ein Kohlenwasserstoffester oder halogener Kohlenwasserstoffester von Orthophosphorsäure oder phosphoriger Säure ist.
14. Katalysatorkomponente für die Olefinpolymerisation, umfassend die folgenden Komponenten:
 - 1) die Katalysatorkomponente gemäß Anspruch 1,
 - 2) Alkylaluminiumverbindung,
 - 3) wahlweise eine externe Elektronendonorkomponente.
15. Katalysator nach Anspruch 14, worin die externe Elektronendonorverbindung durch die Formel $R_nSi(OR')_{4-n}$ dargestellt ist, worin $0 \leq n \leq 3$, R und R' , die identisch oder verschieden voneinander sein können, aus Alkyl-, Cycloalkyl-, Aryl-, halogener Alkyl- und Amingruppe ausgewählt sein können und R ebenfalls Halogen oder Wasserstoffatom sein kann.

16. Präpolymerisierter Katalysator für die Olefinpolymerisation, umfassend eine festen Katalysator nach Anspruch 14 und das Präpolymer, erhalten durch die Präpolymerisation des festen Katalysators nach Anspruch 14 und des Olefins, wobei das Präpolymerisationsvielfache im Bereich von 0,1 bis 1000 g Olefinpolymer pro g der festen Katalysatorkomponente ist.
17. Präpolymerisierter Katalysator nach Anspruch 16, worin das Olefin, das präpolymerisiert wird, Ethylen oder Propylen ist.
18. Verfahren zur Olefinpolymerisation, durchgeführt in der Gegenwart der Katalysatorkomponente nach Anspruch 1, des Katalysators nach Anspruch 14 oder des präpolymerisierten Katalysators nach Anspruch 16.

Revendications

1. Composant de catalyseur pour polymérisation d'oléfine, comprenant du magnésium, du titane, un halogène et un donneur d'électrons, dans lequel le donneur d'électrons est choisi parmi au moins un parmi les composés diester de diol tels que montrés dans la Formule (I), et dans lesdits composés diester de diol tels que montrés dans la Formule (I), la teneur du composé diester de diol avec une formule en projection de Fischer telle que montrée dans la Formule (II) est supérieure ou égale à 35% en poids :



dans les deux de la Formule (I) et de la Formule (II) :

- R_1 et R_2 , qui peuvent être identiques ou différents l'un de l'autre, peuvent être un groupe cycloalkyle en C_3-C_{20} , aryle en C_6-C_{20} ou alkaryle ou aralkyle en C_7-C_{20} , et l'atome d'hydrogène lié à l'atome de carbone dans ledit groupe cycloalkyle, 1 aryle, 1 alkaryle ou aralkyle peut être facultativement substitué par un atome d'halogène, mais R_1 et R_2 ne peuvent être un cycloalkyle en C_3-C_{20} simultanément ;
- R_3 et R_4 , qui peuvent être identiques ou différents l'un de l'autre, peuvent être un atome d'hydrogène, un atome d'halogène, un alkyle à chaîne droite en C_1-C_{10} , un alkyle à chaîne ramifiée en C_3-C_{10} , un cycloalkyle en C_3-C_{10} , un aryle en C_6-C_{10} ou un alkaryle ou un aralkyle en C_7-C_{10} , et R_3 et R_4 peuvent être facultativement liés ensemble pour former un cycle ; et
- R_5 et R_6 , qui peuvent être identiques ou différents l'un de l'autre, peuvent être un atome d'halogène, un alkyle à chaîne droite en C_1-C_{10} , un alkyle à chaîne ramifiée en C_3-C_{10} , un cycloalkyle en C_3-C_{10} , un aryle en C_6-C_{10} ou un alkaryle ou un aralkyle en C_7-C_{10} , et l'atome d'hydrogène lié à l'atome de carbone dans ledit cycloalkyle, 1 aryle, alkaryle ou aralkyle peut être facultativement substitué par un atome d'halogène.
2. Composant de catalyseur pour polymérisation d'oléfine selon la revendication 1, dans lequel, dans ledit composé diester de diol tel que montré dans la Formule (I), la teneur du composé diester de diol avec une formule en projection de Fischer telle que montrée dans la Formule (II) est supérieure ou égale à 51% en poids, préférablement supérieure ou égale à 60% en poids, encore plus préférablement supérieure ou égale à 80% en poids.
3. Composant de catalyseur pour polymérisation d'oléfine selon la revendication 1, dans lequel les groupes R_1 et R_2 sont individuellement choisis parmi un groupe aryle en C_6-C_{20} , alkaryle en C_7-C_{20} , et aralkyle en C_7-C_{20} , et l'atome

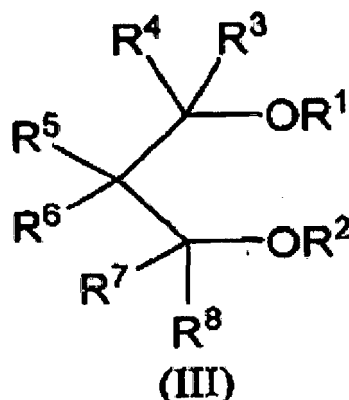
d'hydrogène dans lesdits groupes peut être facultativement substitué par un atome d'halogène, préférablement les groupes R₁ et R₂ sont individuellement choisis parmi un groupe phényle, alkylphényle en C₁-C₅, phényle halogéné, alkylphényle en C₁-C₅ halogéné, indényle, benzyle et phénétyle, encore plus préférablement le groupe R₁ est le même que le groupe R₂.

4. Composant de catalyseur pour polymérisation d'oléfine selon la revendication 1, dans lequel les groupes R₃ et R₄ sont choisis parmi un hydrogène, un groupe méthyle, éthyle, n-propyle, isopropyle, n-butyle, isobutyle, chloro et bromo.
5. Composant de catalyseur pour polymérisation d'oléfine selon la revendication 1, dans lequel les groupes R₅ et R₆ sont choisis parmi un groupe méthyle, éthyle, n-propyle, isopropyle, n-butyle et isobutyle, ou bien l'atome d'hydrogène dans ledit groupe alkyle peut être substitué par un atome d'halogène.
6. Composant de catalyseur pour polymérisation d'oléfine selon la revendication 1, dans lequel les composés avec une formule en projection de Fischer comme la Formule (II) sont choisis parmi les suivants :

un dibenzoate de méso-2,4-pentanediol,
 un dibenzoate de méso-3-méthyl-2,4-pentanediol,
 un dibenzoate de méso-3-éthyl-2,4-pentanediol,
 un dibenzoate de méso-3-propyl-2,4-pentanediol,
 un dibenzoate de méso-3-butyl-2,4-pentanediol,
 un dibenzoate de méso-3,3-diméthyl-2,4-pentanediol,
 un di(p-méthylbenzoate) de méso-2,4-pentanediol,
 un dibenzoate de méso-3-chloro-2,4-pentanediol,
 un dibenzoate de méso-3-bromo-2,4-pentanediol,
 un di(m-méthylbenzoate) de méso-2,4-pentanediol,
 un di(o-méthylbenzoate) de méso-2,4-pentanediol,
 un di(p-éthylbenzoate) de méso-2,4-pentanediol,
 un di(p-butylbenzoate) de méso-2,4-pentanediol,
 un di(p-chlorobenzoate) de méso-2,4-pentanediol,
 un dibenzoate de méso-3,5-heptanediol,
 un dibenzoate de méso-4-méthyl-3,5-heptanediol,
 un dibenzoate de méso-4-diméthyl-3,5-heptanediol,
 un dibenzoate de méso-4-éthyl-3,5-heptanediol,
 un dibenzoate de méso-4-propyl-3,5-heptanediol,
 un dibenzoate de méso-4-butyl-3,5-heptanediol,
 un dibenzoate de méso-4-chloro-3,5-heptanediol,
 un dibenzoate de méso-4-bromo-3,5-heptanediol,
 un di(p-méthylbenzoate) de méso-3,5-heptanediol,
 un di(o-méthylbenzoate) de méso-3,5-heptanediol,
 un di(m-méthylbenzoate) de méso-3,5-heptanediol,
 un di(p-éthylbenzoate) de méso-3,5-heptanediol,
 un di(p-butylbenzoate) de méso-3,5-heptanediol,
 un di(p-chlorobenzoate) de méso-3,5-heptanediol,
 un benzoxycinnamate de (2S,4R)-2,4-pentanediol,
 un benzoxycinnamate de (2S,4R)-3-méthyl-2,4-pentanediol,
 un benzoxycinnamate de (2S,4R)-3-éthyl-2,4-pentanediol,
 un benzoxycinnamate de (2S,4R)-3-propyl-2,4-pentanediol,
 un benzoxycinnamate de (2S,4R)-3-butyl-2,4-pentanediol,
 un benzoxycinnamate de (2S,4R)-3,3-diméthyl-2,4-pentanediol,
 un dibenzoate de (2S,4R)-3-chloro-2,4-pentanediol,
 un benzoxycinnamate de (3S,5R)-3,5-heptanediol,
 un benzoxycinnamate de (3S,5R)-4-méthyl-3,5-heptanediol,
 un benzoxycinnamate de (3S,5R)-4,4-diméthyl-3,5-heptanediol,
 un benzoxycinnamate de (3S,5R)-4-éthyl-3,5-heptanediol,
 un benzoxycinnamate de (3S,5R)-4-propyl-3,5-heptanediol,
 un benzoxycinnamate de (3S,5R)-4-butyl-3,5-heptanediol,
 un benzoxycinnamate de (3S,5R)-4-chloro-3,5-heptanediol,

un dibenzoate de (2S,4R)-6-méthyl-2,4-heptanediol,
 un di(p-butylbenzoate) de (2S,4R)-6-méthyl-2,4-heptanediol,
 un benzoxycinnamate de (2R,4S)-2,4-pentanediol,
 un benzoxycinnamate de (2R,4S)-3-méthyl-2,4-pentanediol,
 un benzoxycinnamate de (2R,4S)-3-éthyl-2,4-pentanediol,
 un benzoxycinnamate de (2R,4S)-3-propyl-2,4-pentanediol,
 un benzoxycinnamate de (2R,4S)-3-butyl-2,4-pentanediol,
 un benzoxycinnamate de (2R,4S)-3,3-diméthyl-2,4-pentanediol,
 un dibenzoate de (2R,4S)-3-chloro-2,4-pentanediol,
 un benzoxycinnamate de (3R,5S)-3,5-heptanediol,
 un benzoxycinnamate de (3R,5S)-4-méthyl-3,5-heptanediol,
 un benzoxycinnamate de (3R,5S)-4,4-diméthyl-3,5-heptanediol,
 un benzoxycinnamate de (3R,5S)-4-éthyl-3,5-heptanediol,
 un benzoxycinnamate de (3R,5S)-4-propyl-3,5-heptanediol,
 un benzoxycinnamate de (3R,5S)-4-butyl-3,5-heptanediol,
 un benzoxycinnamate de (3R,5S)-4-chloro-3,5-heptanediol,
 un dibenzoate de (2R,4S)-6-méthyl-2,4-heptanediol,
 un di(p-butylbenzoate) de (2R,4S)-6-méthyl-2,4-heptanediol.

7. Composant de catalyseur pour polymérisation d'oléfine selon la revendication 1, dans lequel ledit composé diester de diol donneur d'électrons est marqué comme « a », et le composant de catalyseur contient en outre un donneur d'électrons « b », dans lequel « b » est un composé diester de phtalate ou un composé diéther comme montré dans la Formule (III), et le rapport molaire de « a » sur « b » est de 1:0,01 à 1:100 :



dans la Formule (III), R^1 et R^2 , qui peuvent être identiques ou différents l'un de l'autre, peuvent être choisis parmi un groupe alkyle en C_1 - C_{20} et cycloalkyle en C_3 - C_{20} à chaîne droite ou à chaîne ramifiée ; R^3 à R^8 , qui peuvent être identiques ou différents l'un de l'autre, peuvent être choisis parmi un atome d'hydrogène, un atome d'halogène, un alkyle en C_1 - C_{20} , un cycloalkyle en C_3 - C_{20} , un aryle en C_6 - C_{20} et un aralkyle en C_7 - C_{20} à chaîne droite ou à chaîne ramifiée, et les groupes R^3 à R^8 peuvent être facultativement liés ensemble pour former un cycle.

8. Composant de catalyseur pour polymérisation d'oléfine selon la revendication 7, dans lequel le rapport molaire de « a » sur « b » est de 1:0,02 à 1:5.
9. Composant de catalyseur pour polymérisation d'oléfine selon la revendication 1, obtenu par réaction d'un composé de magnésium, d'un composé de titane et dudit composé diester de diol, dans lequel le composé de titane est comme montré dans la Formule de $TiX_n(OR)_{4-n}$, dans laquelle R est un groupe hydrocarbyle ayant 1 à 20 atomes de carbone, X est un halogène, et $n = 0$ à 4 ; et dans lequel le composé de magnésium est choisi parmi un dihalogénure de magnésium, un alcoymagnésium, un alkylmagnésium, un hydrate ou un adduit d'alcool de dihalogénure de magnésium, et les dérivés formés en remplaçant un atome d'halogène du dihalogénure de magnésium par un groupe alcoyle ou halogénoalcoyle.
10. Composant de catalyseur pour polymérisation d'oléfine selon la revendication 9, dans lequel le composé de magnésium utilisé est dissous dans un système de solvant contenant un composé alcoolique organique.

11. Composant de catalyseur pour polymérisation d'oléfine selon la revendication 10, dans lequel le composé alcoolique organique comprend un alcool monohydrique avec les atomes de carbone de 2 à 8.

12. Composant de catalyseur pour polymérisation d'oléfine selon la revendication 9, dans lequel le composé de magnésium utilisé est un adduit d'alcool de dihalogénure de magnésium.

13. Composant de catalyseur pour polymérisation d'oléfine selon la revendication 9, dans lequel le composé de magnésium est dissous dans un système de solvant contenant un composé époxy organique et un composé de phosphore organique, dans lequel le composé époxy organique comprend des oléfines aliphatiques, des diènes, des oléfines aliphatiques halogénées, des oxydes de diènes, des éthers glycidiques et des éthers internes, dont tous ont 2 à 8 atomes de carbone, et le composé de phosphore organique est un ester hydrocarbylique ou un ester hydrocarbylique halogéné de l'acide orthophosphorique ou de l'acide phosphoreux.

14. Catalyseur pour polymérisation d'oléfine, comprenant les composants suivants :

- 1) ledit composant de catalyseur selon la revendication 1,
- 2) un composé alkylaluminium,
- 3) facultativement, un composant donneur d'électrons externe.

15. Catalyseur selon la revendication 14, dans lequel le composé donneur d'électrons externe est comme montré dans la Formule de $R_nSi(OR')_{4-n}$, dans laquelle $0 \leq n \leq 3$, R et R', qui peuvent être identiques ou différents l'un de l'autre, peuvent être choisis parmi un groupe alkyle, cycloalkyle, aryle, alkyle halogéné et amine, et R peut également être un atome d'halogène ou d'hydrogène.

16. Catalyseur prépolymérisé pour polymérisation d'oléfine, comprenant un catalyseur solide selon la revendication 14 et le prépolymère obtenu par la prépolymérisation du catalyseur solide selon la revendication 14 et de l'oléfine, les multiples de prépolymérisation étant dans la plage de 0,1 à 1 000 g de polymère oléfinique par g de composant de catalyseur solide.

17. Catalyseur prépolymérisé selon la revendication 16, dans lequel l'oléfine devant être prépolymérisée est l'éthylène ou le propylène.

18. Procédé de polymérisation d'oléfine mis en oeuvre en présence dudit composant de catalyseur selon la revendication 1, dudit catalyseur selon la revendication 14, ou du catalyseur prépolymérisé selon la revendication 16.

REFERENCES CITED IN THE DESCRIPTION

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