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(54) Titre : CATALYSEUR DE ZIEGLER-NATTA ET SA PREPARATION
(54) Title: ZIEGLER-NATTA CATALYST AND PREPARATION THEREOF

(57) **Abrégé/Abstract:**

This invention relates to a solid $MgCl_2$ based Natta catalyst component (which has been prepared by pre-treating a $MgCl_2 \cdot mROH$ adduct with a compound of group 13 metal and an internal organic compound being a bicyclic ether, and further treated with a transition metal compound of group 4 to 6) for producing olefin polymers and preparation of said catalyst component. Further the invention relates to a Ziegler Natta catalyst comprising said solid catalyst component, Group 13 metal compound as cocatalyst and optionally external additives. The invention further relates to the use of said catalyst component in producing olefin polymers, especially ethylene polymers with desired properties.



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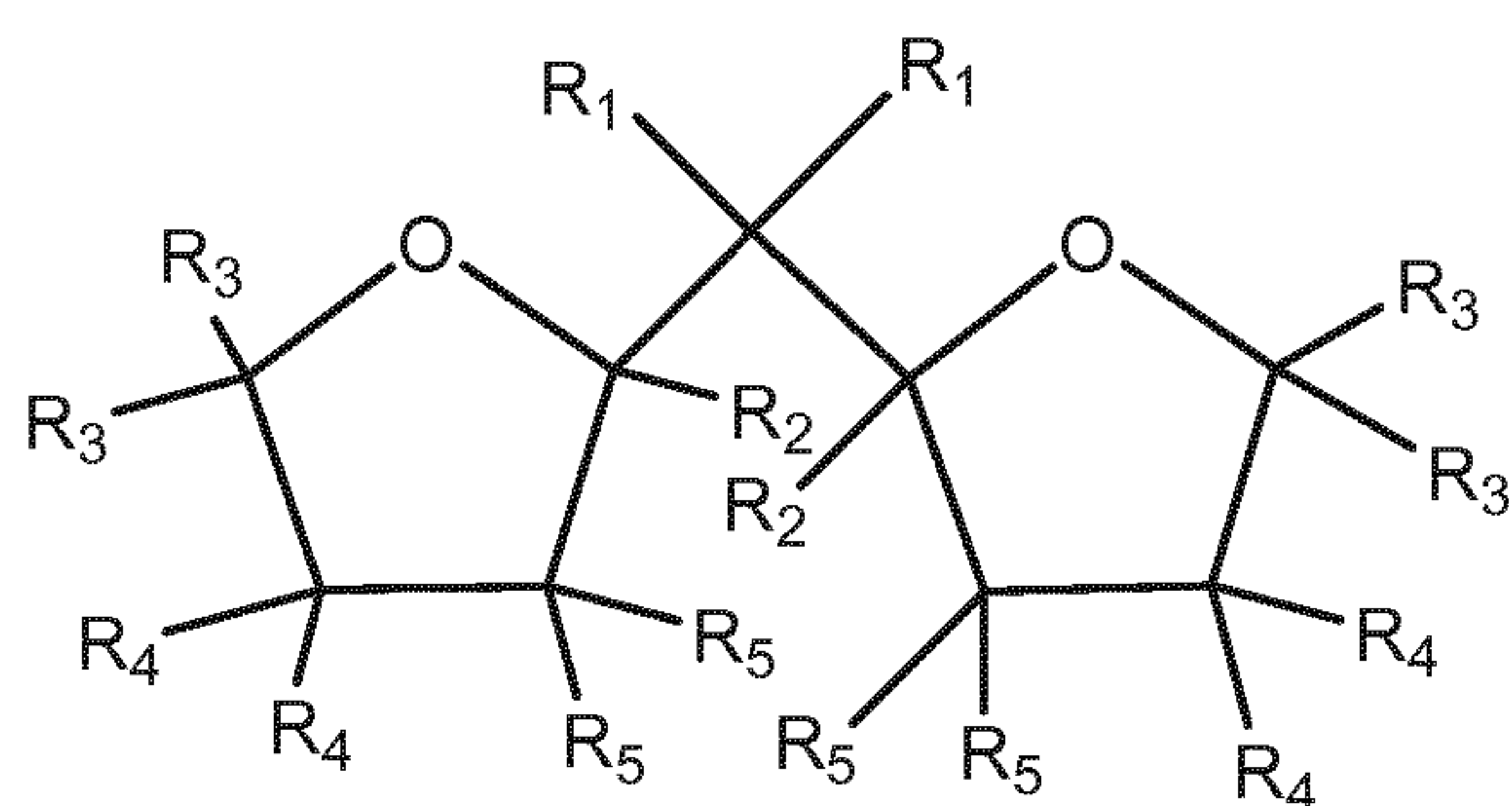
(57) Abstract: This invention relates to a solid MgCl₂based Natta catalyst component (which has been prepared by pre-treating a MgCl₂.mROH adduct with a compound of group 13 metal and an internal organic compound being a bicyclic ether, and further treated with a transition metal compound of group 4 to 6) for producing olefin polymers and preparation of said catalyst component. Further the invention relates to a Ziegler Natta catalyst comprising said solid catalyst component, Group 13 metal compound as cocatalyst and optionally external additives. The invention further relates to the use of said catalyst component in producing olefin polymers, especially ethylene polymers with desired properties.

CLAIMS

1. A method for producing solid MgCl_2 supported catalyst component comprising the steps

- a) providing solid carrier particles of $\text{MgCl}_2 \cdot m\text{ROH}$ adduct;
- b) pre-treating the solid carrier particles of step a) with a compound of Group 13 metal;
- 5 c) treating the pre-treated solid carried particles of step b) with a transition metal compound of Group 4 to 6;
- d) recovering the solid catalyst component;

wherein the solid carrier particles are contacted with an internal organic compound of formula (I) or isomers or mixtures therefrom before treating the solid carrier particles in step c)



(I)

and

wherein in the formula (I)

R_1 to R_5 are the same or different and can be hydrogen, a linear or branched C_1 to C_8 -alkyl group, or a C_3 - C_8 -alkylene group, or two or more of R_1 to R_5 can form a ring,

the two oxygen-containing rings are individually saturated or partially unsaturated or unsaturated, and

R in the adduct $\text{MgCl}_2 \cdot m\text{ROH}$ is a linear or branched alkyl group with 1 to 12 C atoms, and m is 0 to 6.

2. A method according to claim 1, wherein the solid carrier particles are contacted with the internal organic compound of formula (I) or isomers or mixtures therefrom before the pre-treating step b).
3. A method according to claim 1, wherein the solid carrier particles are contacted with the internal organic compound of formula (I) or isomers or mixtures therefrom simultaneously with the pre-treating step b) or after the pre-treating step b) but before the treating step c).
4. A method according to any of the preceding claims wherein in the formula (I) of the internal organic compound

the two R_1 are the same and are a linear C_1 to C_4 -alkyl groups, or the two R_1 form with the carbon atom they are attached to a ring with 3 to 7 C-atoms, preferably cyclopentyl or cyclohexyl ring,

R_2 to R_5 are the same or different and are preferably H or a C_1 to C_2 -alkyl groups, or two or more of R_2 to R_5 residues can form a ring, preferably formed by R_3 and R_4 and/or R_4 and R_5 residues.
5. A method according to any of the preceding claims wherein in the formula (I) of the internal organic compound

both R_1 are the same and are methyl or ethyl groups, preferably methyl groups and

the residues R_2 to R_5 are the same or different and are H or a C_1 to C_2 -alkyl groups and preferably at most two of the residues R_2 to R_5 are a methyl, the others are H and more preferably R_2 to R_5 are all H.
6. A method according to any of the preceding claims wherein the internal organic compound is 2,2-di(2-tetrahydrofuryl)propane, or 2,2-di-(2-furan)-propane, preferably is 2,2-di(2-tetrahydrofuryl)propane.
7. A method according to any of the preceding claims wherein the R in $MgCl_2 \cdot mROH$ adduct is a linear or branched alkyl group containing 1 to 8 C atoms, preferably 1 to 4 C atoms, and m is 1 to 4, preferably m is 2,7 to 3,3.
8. A method according to any of the preceding claims wherein the Group 13 metal compound is an aluminum compound of the formula $Al(alkyl)_xX_{3-x}$ (II), wherein each alkyl is independently a linear, branched or cyclic alkyl group of 1 to 12 C-atoms, preferably 1 to 8 C-atoms, more preferably 1 to 6 C-atoms, X is halogen, preferably chlorine and $1 < x \leq 3$.
9. A method according to any of the preceding claims wherein the Group 13 metal compound is selected from a group comprising dialkyl aluminium chlorides and trialkyl

aluminium, preferably from a group comprising dimethyl aluminium chloride, diethyl aluminium chloride, diisobutyl aluminium chloride, and triethylaluminium or mixtures therefrom, most preferably the aluminium compound is a trialkyl aluminium compound, especially triethylaluminium compound.

- 5 10. A method according to any of the preceding claims wherein no Mg compounds are used in catalyst preparation other than the $\text{MgCl}_2 \cdot m\text{ROH}$ adduct.
11. A solid MgCl_2 supported catalyst component prepared by the method of any of claims 1 to 10.
- 10 12. A solid MgCl_2 supported catalyst component according to claim 11, wherein the final solid catalyst component has Mg/Ti mol/mol ratio of 1 to 10, preferably 2 to 8, Al/Ti mol/mol ratio of 0,01 to 1, preferably 0,1 to 0,5 and Cl/Ti mol/mol ratio of 5 to 20, preferably 10 to 17.
13. A catalyst comprising the solid MgCl_2 supported catalyst component of claim 11 or 12 and a cocatalyst of Group 13 metal compound and optionally an external additive.
- 15 14. Use of the solid MgCl_2 supported catalyst component of claim 11 or 12 in polymerising ethylene optionally with comonomers in a polymerisation process.
- 20 15. A process for producing ethylene polymer in a polymerisation process comprising polymerisation of ethylene, optionally with comonomers selected from C_3 - C_{20} -alpha-olefins, more preferably are selected from C_4 - C_{10} -alpha-olefins, in the presence of the Ziegler-Natta catalyst of claim 13 under polymerisation conditions in at least one polymerisation stage carried out in a solution, slurry or gas phase reactor or combinations thereof.