[Document Name] Claims

[Claim 1]

A method for producing a catalyst for polymerization of an olefin, comprising contacting a solid catalyst component (A) containing magnesium, titanium, halogen and an internal electron-donating compound, wherein the internal electron-donating compound does not have a phthalate ester structure and

an organoaluminum compound (B) represented by the following general formula (I):

$R^1_pAlQ_{3-p}$ (I)

, wherein R^1 represents an alkyl group having 1 to 6 carbon atoms, Q represents a hydrogen atom or a halogen atom, and p represents a real number satisfying $0 < p \leq 3$,

with each other, wherein

at least one selected from the solid catalyst component (A) and the organoaluminum compound (B) is previously subjected to contact treatment with a hydrocarbon compound having one or more vinyl groups, in an organic solvent containing 30% by mass or more of one or more compounds selected from saturated aliphatic hydrocarbon compounds having 20 or more carbon atoms.

[Claim 2]

The method for producing a catalyst for polymerization of an olefin according to claim 1, wherein

the solid catalyst component (A) is previously subjected to the contact treatment with a hydrocarbon compound having one or more vinyl groups, in an organic solvent containing 30% by mass or more of one or more compounds selected from saturated aliphatic hydrocarbon compounds having 20 or more carbon atoms.

[Claim 3]

The method for producing a catalyst for polymerization of an olefin according to claim 2, comprising contacting

a precursor composition (α) of the catalyst for polymerization of an olefin, the precursor composition (α) containing: the solid catalyst component (A) containing magnesium, titanium, halogen and the internal electron-donating compound; a hydrocarbon compound having one or more vinyl groups; and an organic solvent containing 30% by mass or more of one or more compounds selected from saturated aliphatic hydrocarbon compounds having 20 or more carbon atoms, and

the organoaluminum compound (B) represented by the following general formula (I):

$$R^1_pAlQ_{3-p} \qquad (I)$$

, wherein R^1 represents an alkyl group having 1 to 6 carbon atoms, Q represents a hydrogen atom or a halogen atom, and p represents a real number satisfying $0 < p \leq 3$,

with each other.

[Claim 4]

The method for producing a catalyst for polymerization of an olefin according to claim 1, wherein the organoaluminum compound (B) is previously subjected to the contact treatment with a hydrocarbon compound having one or more vinyl groups, in an organic solvent containing 30% by mass or more of one or more compounds selected from saturated aliphatic hydrocarbon compounds having 20 or more carbon atoms.

[Claim 5]

The method for producing a catalyst for polymerization of an olefin according to claim 4, comprising contacting

a precursor composition (β) of the catalyst for polymerization of an olefin, the precursor composition (β) containing: the organoaluminum compound (B) represented by the following general formula (I):

$$R^1_pAlQ_{3-p} \qquad (I)$$

, wherein R^1 represents an alkyl group having 1 to 6 carbon atoms, Q represents a hydrogen atom or a halogen atom, and p represents a real number satisfying $0 < p \leq 3$; a hydrocarbon compound having one or more vinyl groups; and an organic solvent containing 30% by mass or more of one or more compounds selected from saturated aliphatic hydrocarbon compounds having 20 or more carbon atoms, and

the solid catalyst component (A) containing magnesium, titanium, halogen and an internal electron-donating compound,
with each other.

[Claim 6]

The method for producing a catalyst for polymerization of an olefin according to claim 1, wherein

the amount of at least one selected from the solid catalyst component (A) and the organoaluminum compound (B) to be previously subjected to the contact treatment with the hydrocarbon compound having one or more vinyl groups is 1 mol or more per 1 mol of titanium constituting the solid catalyst component (A) that is subjected to production of the catalyst for polymerization of an olefin.

[Claim 7]

The method for producing a catalyst for polymerization of an olefin according to claim 1, wherein the hydrocarbon compound having one or more vinyl groups is one or more compounds selected from ethylene, propylene, 1-butene, 1-pentene, 3-methyl-1-butene, 1-hexene, 4-methyl-1-pentene, 3-methyl-1-pentene, 1,4-hexadiene, 1,5-hexadiene, 1,6-octadiene, 1,7-octadiene, 1-heptene, 1-octene, vinylcyclohexane, and vinylcyclohexene.

[Claim 8]

The method for producing a catalyst for polymerization of an olefin according to claim 1, wherein the organic solvent is a mineral oil.