Claims

[Claim 1]

A solid catalyst component for olefin polymerization comprising a magnesium atom, a titanium atom, a halogen atom, an ester compound (A) represented by the following general formula (1):

R^1-O-C(= O)-CR^2R^3-CR^4R^5-O-R^6 (1)

wherein R^1 and R^6 are each a hydrocarbon group having 1 to 24 carbon atoms and may be the same or different from each other, and R^2 to R^5 are each a hydrogen atom or a hydrocarbon group having 1 to 24 carbon atoms and may be the same or different from each other, and a diester compound (B) represented by the following general formula (2):

R^7R^8C = C($COOR^9$)($COOR^{10}$) (2)

wherein R^7 and R^8 are each a hydrogen atom or a hydrocarbon group having 1 to 24 carbon atoms and may be the same or different from each other, and R^9 and R^{10} are each a hydrocarbon group having 1 to 24 carbon atoms and may be the same or different from each other, wherein a ratio represented by the following expression:

(content (mass%) of ester compound (A) /content (mass%) of diester compound (B))

is 0.05 to 50.

[Claim 2]

The solid catalyst component for olefin polymerization according to claim 1, wherein at least one of the hydrocarbon groups having 1 to 24 carbon atoms constituting the R^1 to R^{10} is a group selected from a linear alkyl group having 1 to 24 carbon atoms, a branched alkyl group having 3 to 24 carbon atoms, a vinyl group, a linear alkenyl group having 3 to 20 carbon atoms, a branched alkenyl group having 3 to 20 carbon atoms, a cycloalkyl group having 3 to 20 carbon atoms, a cycloalkenyl group having 3 to 20 carbon atoms, and an aromatic hydrocarbon group having 6 to 20 carbon atoms.

[Claim 3]

The solid catalyst component for olefin polymerization according to claim 1 or 2, wherein at least one of the R^3 to R^5 is a hydrogen atom.

[Claim 4]

The solid catalyst component for olefin polymerization according to any one of claims 1 to 3, wherein the R^7 is an aromatic hydrocarbon group.

[Claim 5]

A catalyst for olefin polymerization comprising:

(I) the solid catalyst component for olefin polymerization according to any one of claim 1 to 4;

(II) an organoaluminum compound represented by the following general formula (3):

$$R^{11}_pAlQ_{3-p} \quad (3)$$

wherein R^{11} is an alkyl group having 1 to 6 carbon atoms; Q is a hydrogen atom or a halogen atom; p is a real number satisfying $0<p\leq3$; if a plurality of R^{11} are present, R^{11} may be the same or different from each other; and if a plurality of Q are present, Q may be the same or different from each other; and

(III) an external electron-donating compound.

[Claim 6]

The catalyst for olefin polymerization according to claim 5, wherein the external electron-donating compound (III) is one or more selected from:

an organosilicon compound represented by the following general formula (4):

$$R^{12}_{q}Si(OR^{13})_{4-q} \quad (4)$$

wherein R^{12} is any of a linear alkyl group having 1 to 12 carbon atoms, a branched alkyl group having 3 to 12 carbon atoms, a vinyl group, an alkenyl group having 3 to 12 carbon atoms, a cycloalkyl group having 3 to 12 carbon atoms, and an aromatic hydrocarbon group having 6 to 12 carbon atoms, and q is an integer satisfying $0\leq q\leq3$, and if q is 2 or more, a plurality of R^{12} may be the same or different from each other; and R^{13} represents any of a linear alkyl group having 1 to 4 carbon atoms, a branched alkyl group having 3 to 4 carbon atoms, a vinyl group, an alkenyl group having 3 to 12 carbon atoms, a cycloalkyl group having 3 to 12 carbon atoms, and an aromatic hydrocarbon group having 6 to 12 carbon atoms, and a

plurality of R^{13} may be the same or different from each other; and

an organosilicon compound represented by the following general formula (5):

$$(R^{14}R^{15}N)_sSiR^{16})_{4-s} \quad (5)$$

wherein R^{14} and R^{15} are each any of a hydrogen atom, a linear alkyl group having 1 to 12 carbon atoms, a branched alkyl group having 3 to 12 carbon atoms, a vinyl group, an alkenyl group having 3 to 12 carbon atoms, a cycloalkyl group having 3 to 12 carbon atoms, and an aromatic hydrocarbon group having 6 to 12 carbon atoms, and R^{14} and R^{15} may be the same or different from each other and may be bonded to each other to form a ring; and

R^{16} is any of a linear alkyl group having 1 to 12 carbon atoms or a branched alkyl group having 3 to 12 carbon atoms, a vinyl group, an alkenyl group having 3 to 12 carbon atoms, a cycloalkyl group having 3 to 12 carbon atoms, an aromatic hydrocarbon group having 6 to 12 carbon atoms, a linear alkoxy group having 1 to 12 carbon atoms or a branched alkoxy group having 3 to 12 carbon atoms, a vinyloxy group, an allyloxy group having 3 to 12 carbon atoms, and an aryloxy group having 6 to 12 carbon atoms, and if a plurality of R^{16} are present, each R^{16} may be the same or different from each other, and s is an integer of 1 to 3.

[Claim 7]

The catalyst for olefin polymerization according to claim 5, wherein the external electron-donating compound (III) is a diether compound represented by the following general formula (6);

$R^{17}R^{18}R^{19}COCH_2(R^{23}R^{24}C)CH_2OCR^{20}R^{21}R^{22}$ (6)

wherein R^{17} to R^{22} are each any of a hydrogen atom, a linear alkyl group having 1 to 6 carbon atoms, a branched alkyl group having 3 to 6 carbon atoms, a cycloalkyl group having 3 to 6 carbon atoms, and a phenyl group, and may be the same or different from each other; and R^{23} and R^{24} are each any of a hydrogen atom, a linear alkyl group having 1 to 6 carbon atoms, a branched alkyl group having 3 to 6 carbon atoms, a cycloalkyl group having 3 to 6 carbon atoms, and a phenyl group, and may be the same or different from each other and may also be bonded to each other to form a ring.

[Claim 8]

The catalyst for olefin polymerization according to claim 6, wherein the organosilicon compound is one or more selected from phenyltrimethoxysilane, t-butylmethyldimethoxysilane, t-butylethyldimethoxysilane, diisopropyldimethoxysilane, isopropylisobutyl dimethoxysilane, diisopentyldimethoxysilane, diphenyldimethoxysilane, dicyclopentyldimethoxysilane, cyclohexylmethyldimethoxysilane, tetramethoxysilane, tetraethoxysilane, t-butylmethylbis(ethylamino)silane, bis(ethylamino)dicyclohexylsilane,

dicyclopentylbis(ethylamino)silane, bis(perhydroisoquinolino)dimethoxysilane, and diethylaminotriethoxysilane.

[Claim 9]

The catalyst for olefin polymerization according to claim 7, wherein the diether compound is one or more selected from 2-isopropyl-2-isobutyl-1,3-dimethoxypropane, 2-isopropyl-2-isopentyl-1,3-dimethoxypropane, and 9,9-bis(methoxymethyl)fluorene.

[Claim 10]

A method for producing an olefin polymer comprising polymerizing an olefin in the presence of the catalyst for olefin polymerization according to any one of claims 5 to 9.