CLAIMS

1. A method for producing a solid catalyst component for olefin polymerization comprising:

a first step that brings a magnesium compound, a tetravalent titanium halide compound, and one or more first internal electron donor compounds excluding an aromatic dicarboxylic acid diester into contact with each other to effect a reaction, followed by washing;

a second step that brings a tetravalent titanium halide compound and one or more second internal electron donor compounds into contact with a product obtained by the first step to effect a reaction, followed by washing; and

a third step that brings one or more third internal electron donor compounds into contact with a product obtained by the second step in an inert organic solvent for which a tetravalent titanium halide compound content is controlled to 0 to 5 mass%, without adding a tetravalent titanium halide compound, to effect a reaction.

2. The method for producing a solid catalyst component for olefin polymerization according to claim 1, wherein the first internal electron donor compound is one or more compounds selected from an aliphatic polycarboxylic acid ester, an alicyclic polycarboxylic acid ester, and an ether compound.

3. The method for producing a solid catalyst component for olefin polymerization according to claim 1, wherein the second internal electron donor compound is used so that a ratio “molar quantity of the second internal electron donor compound/molar quantity of the magnesium compound” is 0.001 to 10.

4. The method for producing a solid catalyst component for olefin polymerization according to claim 1, wherein the third internal electron donor compound is used so that a ratio “molar quantity of the third internal electron donor compound/molar quantity of the magnesium compound” is 0.001 to 10.

5. The method for producing a solid catalyst component for olefin polymerization according to claim 1, wherein the first internal electron donor compound, the second internal electron donor compound, and the third internal electron donor compound are used so that a relationship “molar quantity of the first internal electron donor compound>molar quantity of the second internal electron donor compound≥molar

quantity of the third internal electron donor compound" is satisfied.

6. An olefin polymerization catalyst produced by bringing a solid catalyst component for olefin polymerization obtained by the method for producing a solid catalyst component for olefin polymerization according to any one of claims 1 to 5, an organoaluminum compound represented by a general formula (I), and an external electron donor compound into contact with each other,

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

wherein R^1 is an alkyl group having 1 to 6 carbon atoms, Q is a hydrogen atom or a halogen atom, and p is a real number that satisfies $0<p\leq3$.

7. The olefin polymerization catalyst according to claim 6, wherein the external electron donor compound is one or more organosilicon compounds selected from an organosilicon compound represented by a general formula (II) and an organosilicon compound represented by a general formula (III),

$$R^2_qSi(OR^3)_{4-q} \quad (II)$$

wherein R^2 is an alkyl group having 1 to 12 carbon atoms, a cycloalkyl group having 3 to 12 carbon atoms, a phenyl group, a vinyl group, an allyl group, or an aralkyl group, provided that a plurality of R^2 are either identical or different when a plurality of R^2 are present, R^3 is an alkyl group having 1 to 4 carbon atoms, a cycloalkyl group having 3 to 6 carbon atoms, a phenyl group, a vinyl group, an allyl group, or an aralkyl group, provided that a plurality of R^3 are either identical or different when a plurality of R^3 are present, and q is an integer from 0 to 3,

$$(R^4R^5N)_sSiR^6_{(4-s)} \quad (III)$$

wherein R^4 and R^5 are a hydrogen atom, a linear alkyl group having 1 to 20 carbon atoms, a branched alkyl group having 3 to 20 carbon atoms, a vinyl group, an allyl group, an aralkyl group, a cycloalkyl group having 3 to 20 carbon atoms, or an aryl group, provided that R^4 and R^5 are either identical or different, and optionally bond to each other to form a ring, R^6 is a linear alkyl group having 1 to 20 carbon atoms, a branched alkyl group having 3 to 20 carbon atoms, a vinyl group, an allyl group, an aralkyl group, a linear or branched alkoxy group having 1 to 20 carbon atoms, a vinyloxy group, an allyloxy group, a cycloalkyl group having 3 to 20 carbon atoms, an aryl group, or an aryloxy group, provided that a plurality of R^6 are either identical or different when a plurality of R^6 are present, and s is an integer from 1 to 3.

8. A method for producing an olefin polymer comprising polymerizing an olefin

in the presence of the olefin polymerization catalyst according to claim 6.

9. A method for producing an olefin polymer comprising polymerizing an olefin in the presence of the olefin polymerization catalyst according to claim 7.