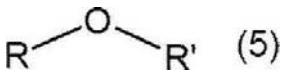
CLAIMS

[Claim 1]

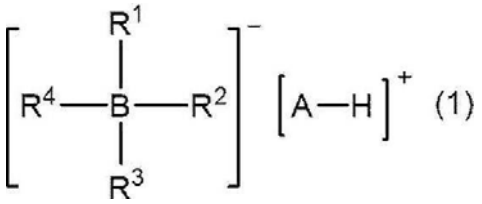
A composition comprising

(I) base A or a compound having a total carbon number of not less than 8 and represented by the following formula (5):



wherein R and R' are each independently an optionally substituted C_{1-30} alkyl group, an optionally substituted C_{3-15} cycloalkyl group, or an optionally substituted C_{6-14} aryl group, and

(II) a compound represented by the following formula (1):



wherein R^1, R^2, R^3 and R^4 are each independently a C_{6-14} aryl group substituted by one or more fluorine atoms or fluoro C_{1-4} alkyl groups, and

$[A\text{-}H]^+$ is a base A-derived cation,

wherein the base A is a nitrogen-containing aromatic heterocyclic compound having a total carbon number of not less than 25 and substituted by the same or different, two or more C_{9-30} alkyl groups or C_{9-30} alkoxy groups.

[Claim 2]

The composition according to claim 1, wherein the component (I) is base A.

[Claim 3]

The composition according to claim 1, wherein the component (I) is a compound represented by the formula (5).

[Claim 4]

The composition according to any one of claims 1 to 3, wherein

R^1, R^2, R^3 and R^4 are each independently a phenyl group, a 1-naphthyl group, a 2-naphthyl group, a 2-biphenylyl group, a 3-

biphenylyl group, a 4-biphenylyl group, a 1-anthryl group, a 2-anthryl group, a 9-anthryl group, a 9-phenanthryl group, or a 3-phenanthryl group, each of which is substituted by one or more fluorine atoms or trifluoromethyl groups.

[Claim 5]

The composition according to any one of claims 1 to 3, wherein all of R^1, R^2, R^3 and R^4 are pentafluorophenyl groups, 2,2',3,3',4',5,5',6,6'-nonafluoro-4-(1,1'-biphenylyl) groups, 2,3,4,5,6,7,8-heptafluoro-1-naphthyl groups, or 1,3,4,5,6,7,8-heptafluoro-2-naphthyl groups.

[Claim 6]

The composition according to any one of claims 1, 2, 4, and 5, wherein the base A is a 5- or 6-membered monocyclic nitrogen-containing aromatic heterocyclic compound having a total carbon number of not less than 25 and substituted by the same or different two C_{9-30} alkyl groups or C_{9-30} alkoxy groups.

[Claim 7]

The composition according to claim 6, wherein the 5- or 6-membered monocyclic nitrogen-containing aromatic heterocyclic compound is pyridine or imidazole.

[Claim 8]

The composition according to any one of claims 1, 2, 4, and 5, wherein the base A is a bicyclic nitrogen-containing aromatic heterocyclic compound having a total carbon number of not less than 25 and substituted by the same or different two C_{9-30} alkyl groups or C_{9-30} alkoxy groups.

[Claim 9]

The composition according to claim 8, wherein the bicyclic nitrogen-containing aromatic heterocyclic compound is benzimidazole.

[Claim 10]

The composition according to any one of claims 1, 2, and 4 to 9, wherein a content of the base A with respect to 1 mol of the compound represented by the formula (1) is within the range of 0.01 to 10 mol.

[Claim 11]

The composition according to any one of claims 1 and 3 to 5, wherein the R and R' are each independently a C_{1-30} alkyl group, and the total carbon number of the R and R' is not less than 8.

[Claim 12]

The composition according to any one of claims 1 and 3 to 5, wherein the R and R' are each independently a C_{1-30} alkyl group, and the total carbon number of the R and R' is not less than 16.

[Claim 13]

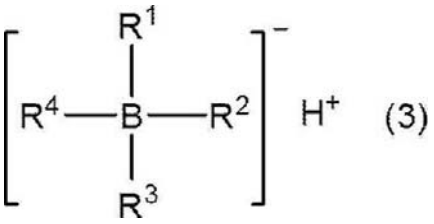
The composition according to any one of claims 1, 3 to 5, 11, and 12, wherein a content of the compound represented by the formula (5) with respect to 1 mol of the compound represented by the formula (1) is within the range of 0.1 - 10 mol.

[Claim 14]

A cocatalyst for polymerization of at least one kind of monomer selected from the group consisting of an olefin and a diene, consisting of the composition according to any one of claims 1 to 13.

[Claim 15]

A method for producing the composition according to any one of claims 1, 2, and 4 to 10, comprising a step of reacting a compound represented by the formula (3):



(3)

wherein R^1, R^2, R^3 and R^4 are each independently a C_{6-14} aryl group substituted by one or more fluorine atoms or fluoro C_{1-4} alkyl groups, and

the base A,

wherein the base A is used in an amount exceeding 1 mol per 1

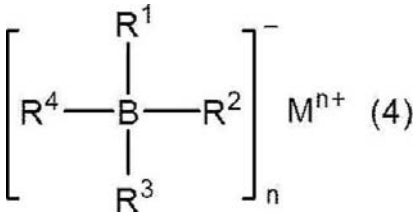
mol of the compound represented by the formula (3).

[Claim 16]

The production method according to claim 15, wherein the amount of the base A is within the range of 1.01 to 3 mol with respect to 1 mol of the compound represented by the formula (3).

[Claim 17]

A method for producing the composition according to any one of claims 1, 2, and 4 to 10, comprising a step of reacting a compound represented by the formula (4):



(4)

wherein R^1, R^2, R^3 and R^4 are each independently a C_{6-14} aryl group substituted by one or more fluorine atoms or fluoro C_{1-4} alkyl groups,

M is an alkali metal or an alkaline earth metal, and

n is 1 or 2,

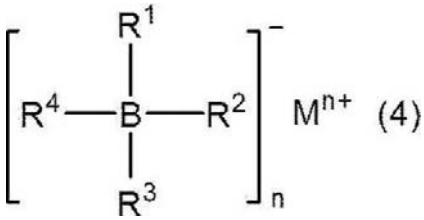
the base A, and

protonic acid,

wherein the base A is used in an amount exceeding 1 mol per 1 mol of the compound represented by the formula (4).

[Claim 18]

A method for producing the composition according to any one of claims 1, 3 to 5, and 11 to 13, comprising a step of reacting a compound represented by the formula (4):



(4)

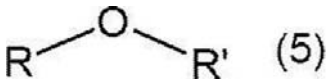
wherein R^1, R^2, R^3 and R^4 are each independently a C_{6-14} aryl group substituted by one or more fluorine atoms or fluoro C_{1-4} alkyl groups,

M is an alkali metal or an alkaline earth metal, and

n is 1 or 2, and

1 mol of the base A per 1 mol of the compound represented by the formula (4) and protonic acid, and thereafter,

a step of adding not less than 0.1 mol of a compound having a total carbon number of not less than 8 and represented by the formula (5):



(5)

wherein R and R' are each independently an optionally substituted C_{1-30} alkyl group, an optionally substituted C_{3-15} cycloalkyl group, or an optionally substituted C_{6-14} aryl group, per 1 mol of the compound represented by the formula (4).

[Claim 19]

A method for producing a polymer, comprising polymerizing at least one kind of monomer selected from the group consisting of olefins and dienes by using the composition according to any one of claims 1 to 13 as a cocatalyst.