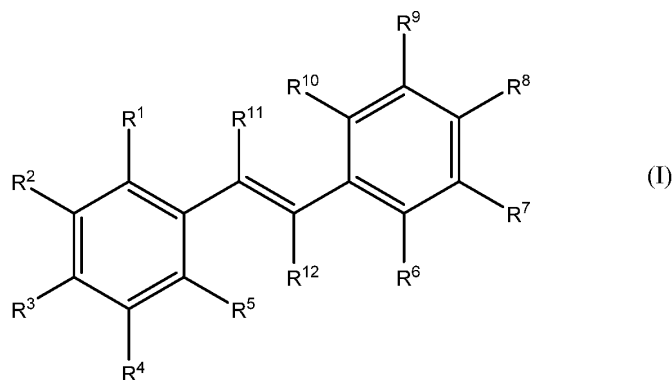


Claims

1. An air-stable $\text{Ni}(\text{R})_3$ -complex wherein Ni represents Ni(0) and R may be the same or different and represents a *trans*-stilbene of the Formula (I):



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wherein R^1 to R^{10} may be the same or different and are selected from H, Cl, Br, F, CN, C_1 to C_6 alkyl or C_3 to C_6 cycloalkyl which alkyl or cycloalkyl may optionally be substituted by one or more halogens, wherein R^{11} to R^{12} may be the same or different and are selected from H, C_1 to C_6 alkyl, C_3 to C_6 cycloalkyl, $-\text{O}-\text{C}_1$ to C_6 alkyl, or $-\text{O}-\text{C}_3$ to C_6 cycloalkyl, with the proviso that at least one of R^1 to R^{12} is not hydrogen.

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2. An air-stable $\text{Ni}(\text{R})_3$ -complex according to claim 1, wherein Ni represents Ni(0),

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wherein R is the same or different and represents a *trans*-stilbene of the Formula (I);

wherein in Formula (I), at least one of R^1 to R^5 and at least one of R^6 to R^{10} are the same or different and are selected from Cl, Br, F, CN, C_1 to C_8 alkyl or C_3 to C_6 cycloalkyl which alkyl or cycloalkyl may optionally be substituted by one or more halogens, and preferably selected from C_1 to C_8 alkyl which may optionally be branched and/or substituted by one or more halogens, and the others of R^1 to R^{10} are hydrogen, and R^{11} to R^{12} may be the same or different and are selected from H, C_1 to C_8 alkyl, C_3 to C_6 cycloalkyl, $-\text{O}-\text{C}_1$ to C_8 alkyl or $-\text{O}-\text{C}_3$ to C_6 cycloalkyl.

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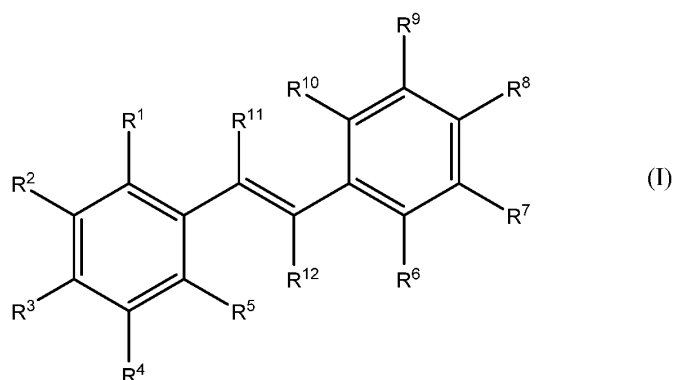
3. An air-stable $\text{Ni}(\text{R})_3$ -complex according to claim 1,

wherein Ni represents Ni(0),

wherein R is the same or different and represents a *trans*-stilbene of the Formula (I):

wherein in Formula (I), R³ and R⁸ are the same or different and are selected from C₁ to C₈ alkyl which may optionally be substituted by one or more halogens, and the others of R¹ to R¹⁰ are hydrogen, and R¹¹ to R¹² may be the same or different and are selected from H, C₁ to C₆ alkyl, -O-C₁ to C₆ alkyl, C₃ to C₆ cycloalkyl or -O-C₃ to C₆ cycloalkyl.

4. An air-stable Ni(R)₃-complex according to claim 1,
wherein Ni represents Ni(0),
wherein R is the same or different and represents a *trans*-stilbene of the Formula (I):
wherein in Formula (I), R³ and R⁸ are the same or different and are selected from C₁ to C₈ perfluoro alkyl and the others of R¹ to R¹⁰ are hydrogen, and R¹¹ to R¹² may be the same or different and are selected from H, C₁ to C₆ alkyl, O-C₁ to C₆ alkyl, C₃ to C₆ cycloalkyl or -O-C₃ to C₆ cycloalkyl.
5. An air-stable Ni(R)₃-complex according to claim 1,
wherein Ni represents Ni(0),
wherein R is the same and represents a *trans*-stilbene of the Formula (I):
wherein in Formula (I), R³ and R⁸ are each C₁ to C₈ perfluoro alkyl and the others of R¹ to R¹⁰ and R¹¹ to R¹² are hydrogen.
6. An air-stable Ni(R)₃-complex according to claim 1,
wherein Ni represents Ni(0),
wherein R is the same and represents a *trans*-stilbene of the Formula (I):
wherein in Formula (I), R³ and R⁸ are each -CF₃, and the others of R¹ to R¹⁰ and R¹¹ to R¹² are hydrogen.
7. Process for preparing an air-stable Ni(R)₃-complex wherein Ni represents Ni(0) and R may be the same or different and represents a *trans*-stilbene of the Formula (I):



wherein R^1 to R^{10} may be the same or different and are selected from H, Cl, Br, F, CN, C_1 to C_6 alkyl or C_3 to C_6 cycloalkyl which alkyl or cycloalkyl may optionally be substituted by one or more halogens,

- 5 wherein R^{11} to R^{12} may be the same or different and are selected from H, C_1 to C_6 alkyl, C_3 to C_6 cycloalkyl, $-O-C_1$ to C_6 alkyl, or $-O-C_3$ to C_6 cycloalkyl, wherein Nickel (II) compound, selected from NiF_2 , $NiCl_2$, $NiBr_2$, NiI_2 , $Ni(OTf)_2$, $Ni(BF_4)_2$, $Ni(OTs)_2$, $Ni(glyme)Cl_2$, $Ni(glyme)Br_2$, $Ni(diglyme)Cl_2$, $Ni(diglyme)Br_2$, $Ni(NO_3)_2$, $Ni(OR^{13})_2$ (where R^{13} represents $-C(O)-C_1-C_6$ -alkyl which is optionally substituted with one of more halogen, preferably Cl or F, $Ni(acetyl\ acetate)_2$, $Ni(Ac)_2$ or mixtures thereof, is reacted with the trans-stilbene of Formula (I), preferably at least three equivalents, in the presence of an aluminum alkyl of the Formula $Al(R^{14})_3$, preferably at least two equivalents, wherein R^{14} may be the same or different and is selected from
- 10 C_1 to C_6 alkyl or C_3 to C_6 cycloalkyl.
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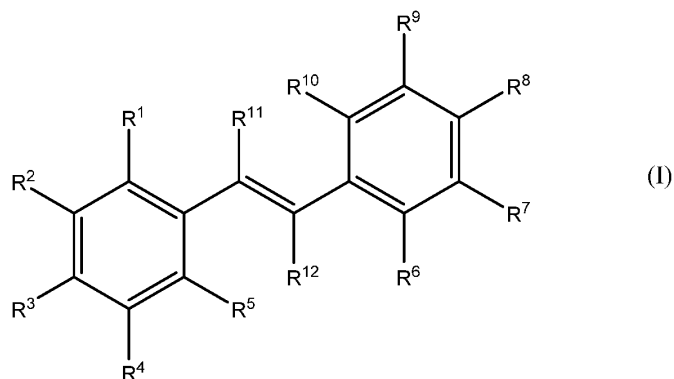
8. Process for preparing an air-stable $Ni(R)_3$ -complex according to claim 7 wherein the aluminum alkyl of the Formula $Al(R^{14})_3$ is selected from $Al(CH_3)_3$ or $Al(C_2H_5)_3$.

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9. Process for preparing an air-stable $Ni(R)_3$ -complex according to claim 7 or 8, wherein R represents a *trans*-stilbene of the Formula (I) as defined in any of claims 2 to 6.

- 25 10. Use of an air-stable $Ni(R)_3$ -complex according to any of claim 1 to 6 as catalyst or precatalyst in organic synthesis, wherein:

Ni represents Ni(0) and R may be the same or different and represents a *trans*-stilbene of the Formula (I):



R¹ to R¹⁰ may be the same or different and are selected from H, Cl, Br, F, CN, C₁ to C₆ alkyl or C₃ to C₆ cycloalkyl which may optionally be substituted by one or more halogens,

R¹¹ to R¹² may be the same or different and are selected from H, -O-C₁ to C₆ alkyl, C₁ to C₆ alkyl or C₃ to C₆ cycloalkyl, optionally with the proviso that at least one of R¹ to R¹² is not hydrogen.

11. Use of an air-stable Ni(R)₃-complex according to any one of claims 1 to 6 as catalyst in organic synthesis.