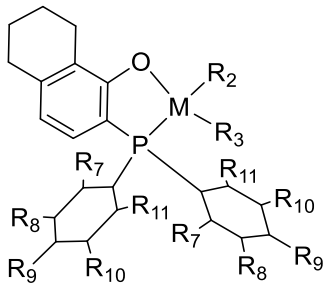
Claims

1. A 5,6,7,8-tetrahydro-1-naphthol-phosphine post-transition metal complex, is characterized in that the complex has a structure represented by formula (I),



Formula (I)

M is selected from group VIII metals, R_7-R_{11} are each independently selected from hydrogen, halogens, hydroxyl, and substituted or unsubstituted C1-C15 hydrocarbyls; R_2 and R_3 are each independently selected from halogens, C1-C10 hydrocarbyls, $P(R_4)_3$, NR_5R_6 and $OR_{12}R_{13}$;

wherein R_4 is selected from substituted or unsubstituted C1-C10 alkyl and substituted or unsubstituted C6-C10 aryl; R_5 and R_6 are each independently selected from C1-C10 hydrocarbyls, or R_5 and R_6 are linked to N to form a five-membered ring or six-membered ring; R_{12} and R_{13} are each independently selected from C1-C10 hydrocarbyls, or R_{12} and R_{13} are linked to O to form a five-membered ring or six-membered ring.

2. The 5,6,7,8-tetrahydro-1-naphthol-phosphine post-transition metal

complex according to claim 1, wherein M is nickel or palladium.

3. The 5,6,7,8-tetrahydro-1-naphthol-phosphine post-transition metal complex according to claim 1 or 2, wherein R_7-R_{11} are each independently selected from hydrogen, halogens, hydroxyl, substituted or unsubstituted C1-C15 alkyl, and substituted or unsubstituted C6-C15 aryl; the substituents are selected from halogen, hydroxyl, C1-C10 alkyl, halogenated C1-C10 alkyl, C1-C10 alkoxy, or halogenated C1-C10 alkoxy.

4. The 5,6,7,8-tetrahydro-1-naphthol-phosphine post-transition metal complex according to any one of claims 1-3, wherein R_2 and R_3 are each independently selected from halogens, C1-C8 hydrocarbyls, $P(R_4)_3$, NR_5R_6 and $OR_{12}R_{13}$, wherein R_4 is selected from substituted or unsubstituted C1-C10 alkyl and substituted or unsubstituted C6-C10 aryl; R_5 and R_6 are each independently selected from C1-C6 hydrocarbyls, or R_5 and R_6 are linked to N to form a five-membered ring or six-membered ring; R_{12} and R_{13} are each independently selected from C1-C6 hydrocarbyls, or R_{12} and R_{13} are linked to O to form a five-membered ring or six-membered ring.

5. The 5,6,7,8-tetrahydro-1-naphthol-phosphine post-transition metal

complex according to any one of claims 1-4, wherein the complex is selected from the group consisting of the following complexes:

Complex 1: a complex presented by formula (I), wherein M is Ni, R_7-R_{11} are each H, R_2 is methyl, and R_3 is $-NC_5H_5$;

Complex 2: a complex presented by formula (I), wherein M is Ni, R_7-R_{11} are each H, R_2 is phenyl, and R_3 is PMe_3;

Complex 3: a complex presented by formula (I), wherein M is Ni, R_7-R_{11} are each H, R_2 is Cl, R_3 is $-OC_4H_8$;

Complex 4: a complex presented by formula (I), wherein M is Ni, R_7-R_{11} are each H, R_2 is Br, R_3 is $-OC_4H_8$;

Complex 5: a complex presented by formula (I), wherein M is Ni, R_7, R_9 and R_{10} are each H, R_8 is methyl, R_{11} is isopropyl, R_2 is methyl, R_3 is $-NC_5H_5$;

Complex 6: a complex presented by formula (I), wherein M is Ni, R_7, R_9 and R_{10} are each H, R_8 is methyl, R_{11} is isopropyl, R_2 is phenyl, R_3 is PMe_3;

Complex 7: a complex presented by formula (I), wherein M is Ni, R_7, R_9 and R_{10} are each H, R_8 is methyl, R_{11} is isopropyl, R_2 is Cl, R_3 is $-OC_4H_8$;

Complex 8: a complex presented by formula (I), wherein M is Ni, R_7, R_9 and R_{10} are each H, R_8 is methyl, R_{11} is isopropyl, R_2 is Br, R_3 is $-OC_4H_8$;

Complex 9: a complex presented by formula (I), wherein M is Pd, R_7-R_{11} are each H, R_2 is methyl, and R_3 is $-NC_5H_5$;

Complex 10: a complex presented by formula (I), wherein M is Pd, R_7-R_{11} are each H, R_2 is Cl, R_3 is PMe_3;

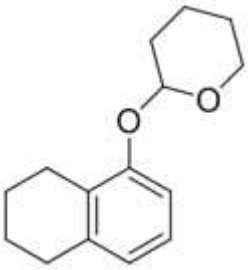
Complex 11: a complex presented by formula (I), wherein M is Pd, R_7, R_9 and R_{10} are each H, R_8 is methyl, R_{11} is isopropyl, R_2 is methyl, R_3 is $-NC_5H_5$;

Complex 12: a complex presented by formula (I), wherein M is Pd, R_7, R_9 and R_{10} are each H, R_8 is methyl, R_{11} is isopropyl, R_2 is Cl, R_3 is PMe_3.

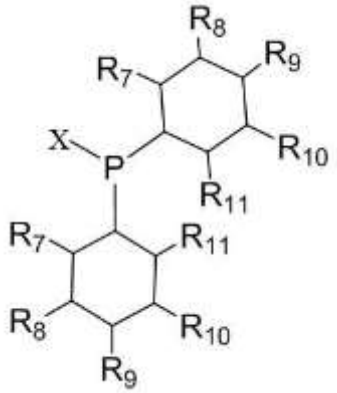
6. A preparation method for the 5,6,7,8-tetrahydro-1-naphthol-phosphine post-transition metal complex, is characterized in that the method comprises the following steps:

(1) reacting a compound represented by formula (II) with a compound represented by formula (III) to obtain a ligand;

(2) subjecting the ligand to the reaction with a M metal compound;



Formula (II)



Formula (III)

Wherein the metal M in said M metal compound is selected from group VIII metals;

in formula (III), X is halogen; R_7-R_{11} are each independently selected

from hydrogen, halogens, hydroxyl, and substituted or unsubstituted C1-C15 hydrocarbyls.

7. The method according to claim 6, wherein the metal M is nickel or palladium.

8. The method according to claim 7, wherein the M metal compound is one or more selected from the group consisting of nickel dimethyl bipyridine, nickel bis(1,5-cyclooctadiene), nickel dichloro tetrapyridine, ethylene glycol dimethyl ether nickel bromide, ethylene glycol dimethyl ether nickel chloride, nickel dichloro-bis(trimethyl phosphine), nickel bis(pyridine) bis[(trimethylsilyl)methyl], (phenyl) (N,N,N',N'-tetramethyl-1,2-ethanediamine) nickel bromide, nickel dibenzyl dipyridine, phenyl (trimethyl phosphine) nickel bromide, phenyl (triethyl phosphine) nickel chloride, nickel diphenyl bis (trimethyl phosphine), nickel dichloro-bis(trimethyl phosphine), palladium dimethyl bipyridine, palladium dichloro-bipyridine, palladium bis(pyridine) bis[(trimethylsilyl)methyl], palladium dibenzyl dipyridine, methyl-1,5-cyclooctadiene-palladium chloride, and palladium dimethyl(N,N,N',N'-tetramethyl-1,2-ethanediamine).

9. The method according to any one of claims 6-8, wherein the reaction

of step (2) is performed in the presence of a reaction solvent, which is toluene and/or tetrahydrofuran.

10. An olefin polymerization process, is characterized in that the process comprises carrying out an olefin polymerization reaction in the presence of 5,6,7,8-tetrahydro-1-naphthol-phosphine post-transition metal complex according to any one of claims 1-5.

11. The process according to claim 10, wherein the olefin polymerization reaction is homopolymerization or copolymerization.

12. The process according to claim 10 or 11, wherein the polymerization monomer is ethylene.

13. The process according to claim 10 or 11, wherein the polymerization monomers comprise ethylene and α-olefin.

14. The process according to claim 10 or 11, wherein the polymerization monomers comprise ethylene and acrylate type monomer.

15. The process according to claim 14, wherein the acrylate type monomer is at least one selected from the group consisting of methyl

(meth) acrylate, ethyl (meth) acrylate, n-propyl (meth) acrylate, isopropyl (meth) acrylate, n-butyl (meth) acrylate, isobutyl (meth) acrylate, t-butyl (meth) acrylate, amyl (meth) acrylate, hexyl (meth) acrylate, cyclohexyl (meth) acrylate, octyl (meth) acrylate, 2-ethylhexyl (meth) acrylate, nonyl (meth) acrylate, decyl (meth) acrylate, dodecyl (meth) acrylate, phenyl (meth) acrylate, toluoyl (meth) acrylate, benzyl (meth) acrylate, hydroxyethyl (meth) acrylate, dimethyl aminoethyl (meth) acrylate, diethyl aminoethyl (meth) acrylate, 2-aminoethyl (meth) acrylate, 2-methoxyethyl (meth) acrylate, 3-methoxy propyl (meth) acrylate, glycidyl (meth) acrylate, oxirane (meth) acrylate, trifluoro methyl (meth) acrylate, 2-trifluoro methyl ethyl (meth) acrylate, perfluoro ethyl (meth) acrylate, (meth) acrylamide, methacryl dimethyl amide, 2-hydroxy butyl (meth) acrylate, and 4-hydroxy butyl (meth) acrylate.

16. The process according to any one of claims 10-15, characterized in that the olefin polymerization reaction temperature is within the range of 30-100°C.