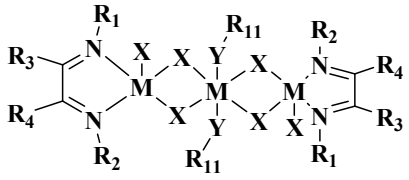
CLAIMS

1. A diimine-metal complex represented by Formula I:



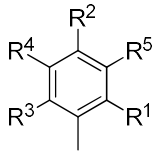
Formula I

wherein, R_1 and R_2 are each independently a C1-C30 hydrocarbyl with or without a substituent Q; R_3 and R_4 are each independently selected from the group consisting of hydrogen, halogen, hydroxy, C1-C20 hydrocarbyl with or without a substituent Q, and adjacent R_3 and R_4 groups are optionally joined to form a ring or ring system; each R_{11} is independently a C1-C20 hydrocarbyl with or without a substituent Q; each Y is independently a Group VIA non-metal atom; each M is independently a Group VIII metal; each X is independently selected from the group consisting of halogen, C1-C10 hydrocarbyl with or without a substituent Q and C1-C10 hydrocarbyloxy with or without a substituent Q,

with the substituent Q being selected from the group consisting of halogen, hydroxy, C1-C10 alkyl, halogenated C1-C10 alkyl, C1-C10 alkoxy and halogenated C1-C10 alkoxy.

2. The diimine-metal complex as claimed in claim 1, having at least one of the following features:

- R_1 and R_2 are independently selected from the group consisting of C1-C20 alkyl with or without a substituent Q and C6-C20 aryl with or without a substituent Q, and preferably R_1 and/or R_2 are/is a group represented by Formula A:



Formula A

wherein, R^1-R^5 are each independently selected from the group consisting of hydrogen, halogen, hydroxy, C1-C20 alkyl with or without a substituent Q, C2-C20 alkenyl with or without a substituent Q, C2-C20 alkynyl with or without a substituent Q, C1-C20 alkoxy with or without a substituent Q, C2-C20 alkenoxy with or without a substituent Q, C2-C20 alkynoxy with or without a substituent Q, C6-C20 aryl with or without a substituent Q, C6-C20 aryloxy with or without a substituent Q, C7-C20 aralkyl with or without a substituent Q, C7-C20 aralkoxy with or without a substituent Q, C7-C20 alkaryl with or without a substituent Q and C7-C20 alkaryloxy with or without a substituent Q, and R^1-R^5 are optionally joined to form a ring or ring system;

preferably, R^1-R^5 are each independently selected from the group consisting of hydrogen, halogen, hydroxy, C1-C10 alkyl with or without a substituent Q, C2-C10 alkenyl with or without

a substituent Q, C2-C10 alkynyl with or without a substituent Q, C3-C10 cycloalkyl with or without a substituent Q, C1-C10 alkoxy with or without a substituent Q, C2-C10 alkenoxy with or without a substituent Q, C2-C10 alkynoxy with or without a substituent Q, C3-C10 cycloalkoxy with or without a substituent Q, C6-C15 aryl with or without a substituent Q, C6-C15 aryloxy with or without a substituent Q, C7-C15 aralkyl with or without a substituent Q, C7-C15 aralkoxy with or without a substituent Q, C7-C15 alkaryl with or without a substituent Q and C7-C15 alkaryloxy with or without a substituent Q;

- each M is independently selected from the group consisting of nickel and palladium;

- each Y is independently selected from the group consisting of O and S;

- each X is independently selected from the group consisting of halogen, C1-C10 alkyl with or without a substituent Q and C1-C10 alkoxy with or without a substituent Q, and preferably from the group consisting of halogen, C1-C6 alkyl with or without a substituent Q and C1-C6 alkoxy with or without a substituent Q;

- each R_{11} is independently a C1-C20 alkyl with or without a substituent Q, preferably a C1-C10 alkyl with or without a substituent Q, and more preferably a C1-C6 alkyl with or without a substituent Q;

- R_3 and R_4 are each independently selected from the group consisting of hydrogen, halogen, hydroxy, C1-C20 alkyl with or without a substituent Q, C2-C20 alkenyl with or without a substituent Q, C2-C20 alkynyl with or without a substituent Q, C1-C20 alkoxy with or without a substituent Q, C2-C20 alkenoxy with or without a substituent Q, C2-C20 alkynoxy with or without a substituent Q, C6-C20 aryl with or without a substituent Q, C6-C20 aryloxy with or without a substituent Q, C7-C20 aralkyl with or without a substituent Q, C7-C20 aralkoxy with or without a substituent Q, C7-C20 alkaryl with or without a substituent Q and C7-C20 alkaryloxy with or without a substituent Q;

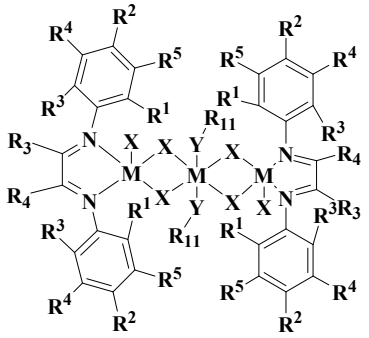
preferably, R_3 and R_4 are each independently selected from the group consisting of hydrogen, halogen, hydroxy, C1-C10 alkyl with or without a substituent Q, C2-C10 alkenyl with or without a substituent Q, C2-C10 alkynyl with or without a substituent Q, C3-C10 cycloalkyl with or without a substituent Q, C1-C10 alkoxy with or without a substituent Q, C2-C10 alkenoxy with or without a substituent Q, C2-C10 alkynoxy with or without a substituent Q, C3-C10 cycloalkoxy with or without a substituent Q, C6-C15 aryl with or without a substituent Q, C6-C15 aryloxy with or without a substituent Q, C7-C15 aralkyl with or without a substituent Q, C7-C15 aralkoxy with or without a substituent Q, C7-C15 alkaryl with or without a substituent Q and C7-C15 alkaryloxy with or without a substituent Q;

more preferably, R_3 and R_4 are each independently selected from the group consisting of hydrogen, C1-C10 alkyl, halogenated C1-C10 alkyl, C1-C10 alkoxy, halogenated C1-C10

alkoxy and halogen, and more preferably from the group consisting of hydrogen, C1-C6 alkyl, halogenated C1-C6 alkyl, C1-C6 alkoxy, halogenated C1-C6 alkoxy and halogen;

- the substituent Q is selected from the group consisting of halogen, hydroxy, C1-C6 alkyl, halogenated C1-C6 alkyl, C1-C6 alkoxy and halogenated C1-C6 alkoxy.

3. The diimine-metal complex as claimed in any one of claims 1 to 2, which is represented by Formula III:



Formula III

wherein, R^1-R^5 are each independently selected from the group consisting of hydrogen, halogen, hydroxy, C1-C10 alkyl with or without a substituent Q, C3-C10 cycloalkyl with or without a substituent Q, C1-C10 alkoxy with or without a substituent Q, C3-C10 cycloalkoxy with or without a substituent Q, C6-C15 aryl with or without a substituent Q, C7-C15 aralkyl with or without a substituent Q and C7-C15 alkaryl with or without a substituent Q;

R_3 and R_4 are each independently selected from the group consisting of hydrogen, C1-C10 alkyl, halogenated C1-C10 alkyl, C1-C10 alkoxy, halogenated C1-C10 alkoxy and halogen, and more preferably from the group consisting of hydrogen, C1-C6 alkyl, halogenated C1-C6 alkyl, C1-C6 alkoxy, halogenated C1-C6 alkoxy and halogen;

each M is nickel;

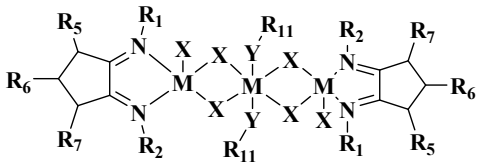
each Y is O;

each X is independently selected from the group consisting of fluorine, chlorine and bromine;

each R_{11} is independently a C1-C20 alkyl with or without a substituent Q, preferably a C1-C10 alkyl with or without a substituent Q, and more preferably a C1-C6 alkyl with or without a substituent Q;

preferably, the substituent Q are independently selected from the group consisting of halogen, hydroxy, C1-C6 alkyl, halogenated C1-C6 alkyl, C1-C6 alkoxy and halogenated C1-C6 alkoxy.

4. The diimine-metal complex as claimed in claim 1, which is represented by Formula Ia:



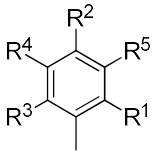
Formula Ia

wherein, R_5-R_7 are each independently selected from the group consisting of hydrogen, halogen, hydroxy, and C1-C20 hydrocarbyl with or without a substituent Q, and R_5-R_7 are optionally joined to form a ring or ring system;

R_1, R_2, R_{11}, Y, M and X are as defined in claim 1.

5. The diimine-metal complex as claimed in claim 4, having at least one of the following features:

- R_1 and R_2 are independently selected from the group consisting of C1-C20 alkyl with or without a substituent Q and C6-C20 aryl with or without a substituent Q, and preferably R_1 and/or R_2 are/is a group represented by Formula A:



Formula A

wherein, R^1-R^5 are each independently selected from the group consisting of hydrogen, halogen, hydroxy, C1-C20 alkyl with or without a substituent Q, C2-C20 alkenyl with or without a substituent Q, C2-C20 alkynyl with or without a substituent Q, C3-C20 cycloalkyl with or without a substituent Q (according to the definitions in the description, alkyl encompasses cycloalkyl so that the cycloalkyl seems redundant here), C1-C20 alkoxy with or without a substituent Q, C2-C20 alkenoxy with or without a substituent Q, C2-C20 alkynoxy with or without a substituent Q, C6-C20 aryl with or without a substituent Q, C6-C20 aryloxy with or without a substituent Q, C7-C20 aralkyl with or without a substituent Q, C7-C20 aralkoxy with or without a substituent Q, C7-C20 alkaryl with or without a substituent Q and C7-C20 alkaryloxy with or without a substituent Q, and R^1-R^5 are optionally joined to form a ring or ring system;

preferably, R^1-R^5 are each independently selected from the group consisting of hydrogen, halogen, hydroxy, C1-C10 alkyl with or without a substituent Q, C2-C10 alkenyl with or without a substituent Q, C2-C10 alkynyl with or without a substituent Q, C3-C10 cycloalkyl with or without a substituent Q, C1-C10 alkoxy with or without a substituent Q, C2-C10 alkenoxy with or without a substituent Q, C2-C10 alkynoxy with or without a substituent Q, C3-C10 cycloalkoxy with or without a substituent Q, C6-C15 aryl with or without a substituent Q, C6-C15 aryloxy with or without a substituent Q, C7-C15 aralkyl with or without a substituent Q, C7-C15 aralkoxy with or without a substituent Q, C7-C15 alkaryl with or without a substituent Q

and C7-C15 alkaryloxy with or without a substituent Q;

- each M is independently selected from the group consisting of nickel and palladium;

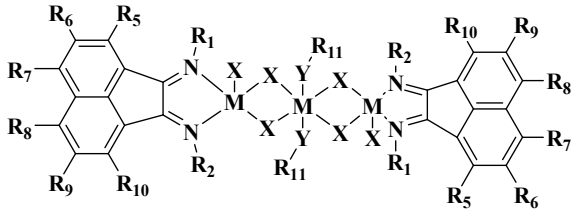
- each Y is independently selected from the group consisting of O and S;

- each X is independently selected from the group consisting of halogen, C1-C10 alkyl with or without a substituent Q and C1-C10 alkoxy with or without a substituent Q, and preferably from the group consisting of halogen, C1-C6 alkyl with or without a substituent Q and C1-C6 alkoxy with or without a substituent Q;

- each R_{11} is independently a C1-C20 alkyl with or without a substituent Q, preferably a C1-C10 alkyl with or without a substituent Q, and more preferably a C1-C6 alkyl with or without a substituent Q; and

- the substituent Q is selected from the group consisting of halogen, hydroxy, C1-C6 alkyl, halogenated C1-C6 alkyl, C1-C6 alkoxy and halogenated C1-C6 alkoxy.

6. The diimine-metal complex as claimed in claim 4 or 5, which is represented by Formula IIa:



Formula IIa

wherein, R_5-R_{10} are each independently selected from the group consisting of hydrogen, halogen, hydroxy, C1-C20 alkyl with or without a substituent Q, C2-C20 alkenyl with or without a substituent Q, C2-C20 alkynyl with or without a substituent Q, C1-C20 alkoxy with or without a substituent Q, C2-C20 alkenoxy with or without a substituent Q, C2-C20 alkynoxy with or without a substituent Q, C6-C20 aryl with or without a substituent Q, C6-C20 aryloxy with or without a substituent Q, C7-C20 aralkyl with or without a substituent Q, C7-C20 aralkoxy with or without a substituent Q, C7-C20 alkaryl with or without a substituent Q and C7-C20 alkaryloxy with or without a substituent Q,

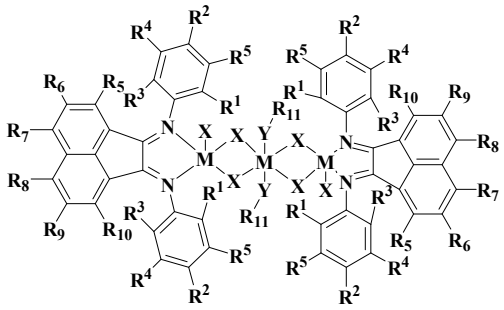
R_1, R_2, M, X, Y and R_{11} are as defined in claim 4.

7. The diimine-metal complex as claimed in any one of claims 4 to 6, wherein the R_5-R_7 in Formula Ia and the R_5-R_{10} in Formula IIa are each independently selected from the group consisting of hydrogen, halogen, hydroxy, C1-C10 alkyl with or without a substituent Q, C2-C10 alkenyl with or without a substituent Q, C2-C10 alkynyl with or without a substituent Q, C3-C10 cycloalkyl with or without a substituent Q, C1-C10 alkoxy with or without a substituent Q, C2-C10 alkenoxy with or without a substituent Q, C2-C10 alkynoxy with or without a substituent Q, C3-C10 cycloalkoxy with or without a substituent Q, C6-C15 aryl with or without a substituent Q, C6-C15 aryloxy with or without a substituent Q, C7-C15 aralkyl with or without

a substituent Q, C7-C15 aralkoxy with or without a substituent Q, C7-C15 alkaryl with or without a substituent Q and C7-C15 alkaryloxy with or without a substituent Q;

preferably, the R_5-R_7 in Formula Ia and the R_5-R_{10} in Formula IIa are each independently selected from the group consisting of hydrogen, C1-C10 alkyl, halogenated C1-C10 alkyl, C1-C10 alkoxy, halogenated C1-C10 alkoxy and halogen, and more preferably from the group consisting of hydrogen, C1-C6 alkyl, halogenated C1-C6 alkyl, C1-C6 alkoxy, halogenated C1-C6 alkoxy and halogen.

8. The diimine-metal complex as claimed in any one of claims 4 to 7, which is represented by Formula IIIa:



Formula IIIa

wherein, R^1-R^5 are each independently selected from the group consisting of hydrogen, halogen, C1-C6 alkyl with or without a substituent Q and C1-C6 alkoxy with or without a substituent Q; R_5-R_{10} are each independently selected from the group consisting of hydrogen, halogen, C1-C6 alkyl and C1-C6 alkoxy; each M is nickel; each Y is O; each X is independently a halogen; each R_{11} is independently a C1-C6 alkyl with or without a substituent Q;

preferably, the diimine-metal complex is selected from the group consisting of

1) the complex represented by Formula IIIa, wherein R^1=R^3=isopropyl, R^2=R^4=R^5=R_5 - R_{10}=H, R_{11}=methyl, M=Ni, Y=O, X=Br;

2) the complex represented by Formula IIIa, wherein R^1=R^3=ethyl, R^2=R^4=R^5=R_5 - R_{10}=H, R_{11}=methyl, M=Ni, Y=O, X=Br;

3) the complex represented by Formula IIIa, wherein R^1=R^3=methyl, R^2=R^4=R^5=R_5 - R_{10}=H, R_{11}=methyl, M=Ni, Y=O, X=Br;

4) the complex represented by Formula IIIa, wherein R^1- R^3=methyl, R^4=R^5=R_5 - R_{10}=H, R_{11}=methyl, M=Ni, Y=O, X=Br;

5) the complex represented by Formula IIIa, wherein R^1=R^3=methyl, R^2=Br, R^4=R^5=R_5 - R_{10}=H, R_{11}=methyl, M=Ni, Y=O, X=Br;

6) the complex represented by Formula IIIa, wherein R^1=R^3=Br, R^2=R^4=R^5=R_5 - R_{10}=H, R_{11}=methyl, M=Ni, Y=O, X=Br;

7) the complex represented by Formula IIIa, wherein R^1=R^3=Cl, R^2=R^4=R^5=R_5 - R_{10}=H, R_{11}=methyl, M=Ni, Y=O, X=Br;

8) the complex represented by Formula IIIa, wherein R^1=R^3=F, R^2=R^4=R^5=R_5 - R_{10}=H, R_{11}=methyl, M=Ni, Y=O, X=Br;

9) the complex represented by Formula IIIa, wherein R^1=R^3=isopropyl, R^2=R^4=R^5=R_5 - R_{10}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

10) the complex represented by Formula IIIa, wherein R^1=R^3=ethyl, R^2=R^4=R^5=R_5 - R_{10}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

11) the complex represented by Formula IIIa, wherein R^1=R^3=methyl, R^2=R^4=R^5=R_5 - R_{10}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

12) the complex represented by Formula IIIa, wherein R^1- R^3=methyl, R^4=R^5=R_5 - R_{10}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

13) the complex represented by Formula IIIa, wherein R^1=R^3=methyl, R^2=Br, R^4=R^5=R_5 - R_{10}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

14) the complex represented by Formula IIIa, wherein R^1=R^3=Br, R^2=R^4=R^5=R_5 - R_{10}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

15) the complex represented by Formula IIIa, wherein R^1=R^3=Cl, R^2=R^4=R^5=R_5 - R_{10}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

16) the complex represented by Formula IIIa, wherein R^1=R^3=F, R^2=R^4=R^5=R_5 - R_{10}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

17) the complex represented by Formula IIIa, wherein R^1=R^3=isopropyl, R^2=R^4=R^5=R_5 - R_{10}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

18) the complex represented by Formula IIIa, wherein R^1=R^3=ethyl, R^2=R^4=R^5=R_5 - R_{10}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

19) the complex represented by Formula IIIa, wherein R^1=R^3=methyl, R^2=R^4=R^5=R_5 - R_{10}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

20) the complex represented by Formula IIIa, wherein R^1- R^3=methyl, R^4=R^5=R_5 - R_{10}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

21) the complex represented by Formula IIIa, wherein R^1=R^3=methyl, R^2=Br, R^4=R^5=R_5 - R_{10}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

22) the complex represented by Formula IIIa, wherein R^1=R^3=Br, R^2=R^4=R^5=R_5 - R_{10}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

23) the complex represented by Formula IIIa, wherein R^1=R^3=Cl, R^2=R^4=R^5=R_5 - R_{10}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

24) the complex represented by Formula IIIa, wherein R^1=R^3=F, R^2=R^4=R^5=R_5 - R_{10}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

25) the complex represented by Formula IIIa, wherein R^1=R^3=isopropyl, R^2=R^4=R^5=R_5=R_6

$=R_9=R_{10}$=H, $R_7=R_8$=methyl, R_{11}=ethyl, M=Ni, Y=O, X=Br;

26) the complex represented by Formula IIIa, wherein $R^1=R^3$=ethyl, $R^2=R^4=R^5=R_5=R_6=R_9=R_{10}$=H, $R_7=R_8$=methyl, R_{11}=ethyl, M=Ni, Y=O, X=Br;

27) the complex represented by Formula IIIa, wherein $R^1=R^3$=methyl, $R^2=R^4=R^5=R_5=R_6=R_9=R_{10}$=H, $R_7=R_8$=methyl, R_{11}=ethyl, M=Ni, Y=O, X=Br;

28) the complex represented by Formula IIIa, wherein R^1- R^3=methyl, $R^4=R^5=R_5=R_6=R_9=R_{10}$=H, $R_7=R_8$=methyl, R_{11}=ethyl, M=Ni, Y=O, X=Br;

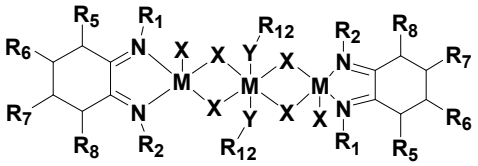
29) the complex represented by Formula IIIa, wherein $R^1=R^3$=methyl, R^2=Br, $R^4=R^5=R_5=R_6=R_9=R_{10}$=H, $R_7=R_8$=methyl, R_{11}=ethyl, M=Ni, Y=O, X=Br;

30) the complex represented by Formula IIIa, wherein $R^1=R^3$=Br, $R^2=R^4=R^5=R_5=R_6=R_9=R_{10}$=H, $R_7=R_8$=methyl, R_{11}=ethyl, M=Ni, Y=O, X=Br;

31) the complex represented by Formula IIIa, wherein $R^1=R^3$=Cl, $R^2=R^4=R^5=R_5=R_6=R_9=R_{10}$=H, $R_7=R_8$=methyl, R_{11}=ethyl, M=Ni, Y=O, X=Br; and

32) the complex represented by Formula IIIa, wherein $R^1=R^3$=F, $R^2=R^4=R^5=R_5=R_6=R_9=R_{10}$=H, $R_7=R_8$=methyl, R_{11}=ethyl, M=Ni, Y=O, X=Br.

9. The diimine-metal complex as claimed in claim 1, which is represented by Formula Ib:

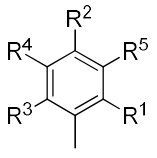


Formula Ib

wherein, R_1 and R_2 are each independently a C1-C30 hydrocarbyl with or without a substituent Q; R_5-R_8 are each independently selected from the group consisting of hydrogen, halogen, hydroxy, C1-C20 hydrocarbyl with or without a substituent Q, and R_5-R_8 are optionally joined to form a ring or ring system; each R_{12} is independently a C1-C20 hydrocarbyl with or without a substituent Q; each Y is independently a Group VIA nonmetal atom; each M is independently a Group VIII metal; each X is independently selected from the group consisting of halogen, C1-C10 hydrocarbyl with or without a substituent Q and C1-C10 hydrocarbyloxy with or without a substituent Q.

10. The diimine-metal complex as claimed in claim 9, having at least one of the following features:

- R_1 and R_2 are independently selected from the group consisting of C1-C20 alkyl with or without a substituent Q and C6-C20 aryl with or without a substituent Q, and preferably R_1 and/or R_2 are/is a group represented by Formula A:



Formula A

wherein, R^1-R^5 are each independently selected from the group consisting of hydrogen, halogen, hydroxy, C1-C20 alkyl with or without a substituent Q, C2-C20 alkenyl with or without a substituent Q, C2-C20 alkynyl with or without a substituent Q, C3-C20 cycloalkyl with or without a substituent Q (according to the definitions in the description, alkyl encompasses cycloalkyl so that the cycloalkyl seems redundant here), C1-C20 alkoxy with or without a substituent Q, C2-C20 alkenoxy with or without a substituent Q, C2-C20 alkynoxy with or without a substituent Q, C6-C20 aryl with or without a substituent Q, C6-C20 aryloxy with or without a substituent Q, C7-C20 aralkyl with or without a substituent Q, C7-C20 aralkoxy with or without a substituent Q, C7-C20 alkaryl with or without a substituent Q and C7-C20 alkaryloxy with or without a substituent Q, and R^1-R^5 are optionally joined to form a ring or ring system;

preferably, R^1-R^5 are each independently selected from the group consisting of hydrogen, halogen, hydroxy, C1-C10 alkyl with or without a substituent Q, C2-C10 alkenyl with or without a substituent Q, C2-C10 alkynyl with or without a substituent Q, C3-C10 cycloalkyl with or without a substituent Q, C1-C10 alkoxy with or without a substituent Q, C2-C10 alkenoxy with or without a substituent Q, C2-C10 alkynoxy with or without a substituent Q, C3-C10 cycloalkoxy with or without a substituent Q, C6-C15 aryl with or without a substituent Q, C6-C15 aryloxy with or without a substituent Q, C7-C15 aralkyl with or without a substituent Q, C7-C15 aralkoxy with or without a substituent Q, C7-C15 alkaryl with or without a substituent Q and C7-C15 alkaryloxy with or without a substituent Q;

- each M is independently selected from the group consisting of nickel and palladium;

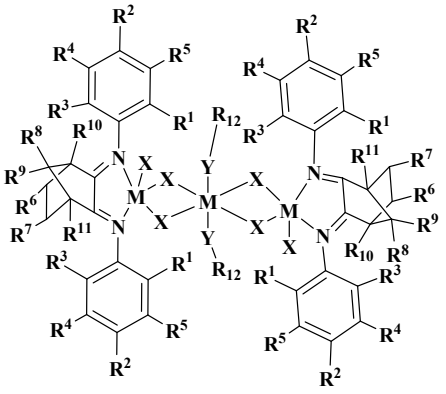
- each Y is independently selected from the group consisting of O and S;

- each X is independently selected from the group consisting of halogen, C1-C10 alkyl with or without a substituent Q and C1-C10 alkoxy with or without a substituent Q, and preferably from the group consisting of halogen, C1-C6 alkyl with or without a substituent Q and C1-C6 alkoxy with or without a substituent Q;

- each R_{12} is independently a C1-C20 alkyl with or without a substituent Q, preferably a C1-C10 alkyl with or without a substituent Q, and more preferably a C1-C6 alkyl with or without a substituent Q; and

- the substituent Q is selected from the group consisting of halogen, hydroxy, C1-C6 alkyl, halogenated C1-C6 alkyl, C1-C6 alkoxy and halogenated C1-C6 alkoxy.

11. The diimine-metal complex as claimed in claim 9 or 10, which is represented by Formula IIIb:



Formula IIIb

wherein, R^1-R^{11} are each independently selected from the group consisting of hydrogen, halogen, hydroxy, C1-C20 alkyl with or without a substituent Q, C2-C20 alkenyl with or without a substituent Q, C2-C20 alkynyl with or without a substituent Q, C1-C20 alkoxy with or without a substituent Q, C2-C20 alkenoxy with or without a substituent Q, C2-C20 alkynoxy with or without a substituent Q, C6-C20 aryl with or without a substituent Q, C6-C20 aryloxy with or without a substituent Q, C7-C20 aralkyl with or without a substituent Q, C7-C20 aralkoxy with or without a substituent Q, C7-C20 alkaryl with or without a substituent Q and C7-C20 alkaryloxy with or without a substituent Q,

M, X, Y and R_{12} are as defined in claim 9.

12. The diimine-metal complex as claimed in any one of claims 9 to 11, wherein R^1-R^{11} are each independently selected from the group consisting of hydrogen, halogen, hydroxy, C1-C10 alkyl with or without a substituent Q, C2-C10 alkenyl with or without a substituent Q, C2-C10 alkynyl with or without a substituent Q, C3-C10 cycloalkyl with or without a substituent Q, C1-C10 alkoxy with or without a substituent Q, C2-C10 alkenoxy with or without a substituent Q, C2-C10 alkynoxy with or without a substituent Q, C3-C10 cycloalkoxy with or without a substituent Q, C6-C15 aryl with or without a substituent Q, C6-C15 aryloxy with or without a substituent Q, C7-C15 aralkyl with or without a substituent Q, C7-C15 aralkoxy with or without a substituent Q, C7-C15 alkaryl with or without a substituent Q and C7-C15 alkaryloxy with or without a substituent Q;

preferably, R^1-R^{11} are each independently selected from the group consisting of hydrogen, C1-C10 alkyl, halogenated C1-C10 alkyl, C1-C10 alkoxy, halogenated C1-C10 alkoxy and halogen, and more preferably from the group consisting of hydrogen, C1-C6 alkyl, halogenated C1-C6 alkyl, C1-C6 alkoxy, halogenated C1-C6 alkoxy and halogen.

13. The diimine-metal complex as claimed in any one of claims 9 to 12, which is selected from the group consisting of

1) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3=methyl, R^2=R^4-R^7 =R^{10}=H, R^8=R^9=R^{11}=R_{12}=methyl, M=Ni, Y=O, X=Br;

2) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3=ethyl, R^2=R^4-R^7 =R^{10}=H, R^8=R^9=R^{11}=R_{12}=methyl, M=Ni, Y=O, X=Br;

3) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3 =isopropyl, R^2=R^4-R^7 =R^{10}=H, R^8=R^9=R^{11}=R_{12}=methyl, M=Ni, Y=O, X=Br;

4) the diimine-metal complex represented by Formula IIIb, wherein R^1- R^3 =methyl, R^4-R^7 =R^{10}=H, R^8=R^9=R^{11}=R_{12}=methyl, M=Ni, Y=O, X=Br;

5) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3 =methyl, R^2=Br, R^4-R^7 =R^{10}=H, R^8=R^9=R^{11}=R_{12}=methyl, M=Ni, Y=O, X=Br;

6) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3=F, R^2=R^4-R^7 =R^{10}=H, R^8=R^9=R^{11}=R_{12}=methyl, M=Ni, Y=O, X=Br;

7) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3=Cl, R^2=R^4-R^7 =R^{10}=H, R^8=R^9=R^{11}=R_{12}=methyl, M=Ni, Y=O, X=Br;

8) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3=Br, R^2=R^4-R^7 =R^{10}=H, R^8=R^9=R^{11}=R_{12}=methyl, M=Ni, Y=O, X=Br;

9) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3=methyl, R^2=R^4-R^7 =R^{10}=H, R^8=R^9=R^{11}=methyl, R_{12}=ethyl, M=Ni, Y=O, X=Br;

10) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3=ethyl, R^2=R^4-R^7 =R^{10}=H, R^8=R^9=R^{11}=methyl, R_{12}=ethyl, M=Ni, Y=O, X=Br;

11) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3 =isopropyl, R^2=R^4-R^7 =R^{10}=H, R^8=R^9=R^{11}=methyl, R_{12}=ethyl, M=Ni, Y=O, X=Br;

12) the diimine-metal complex represented by Formula IIIb, wherein R^1- R^3 =methyl, R^4-R^7 =R^{10}=H, R^8=R^9=R^{11}=methyl, R_{12}=ethyl, M=Ni, Y=O, X=Br;

13) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3 =methyl, R^2=Br, R^4-R^7 =R^{10}=H, R^8=R^9=R^{11}=methyl, R_{12}=ethyl, M=Ni, Y=O, X=Br;

14) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3=F, R^2=R^4-R^7 =R^{10}=H, R^8=R^9=R^{11}=methyl, R_{12}=ethyl, M=Ni, Y=O, X=Br;

15) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3=Cl, R^2=R^4-R^7 =R^{10}=H, R^8=R^9=R^{11}=methyl, R_{12}=ethyl, M=Ni, Y=O, X=Br;

16) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3=Br, R^2=R^4-R^7 =R^{10}=H, R^8=R^9=R^{11}=methyl, R_{12}=ethyl, M=Ni, Y=O, X=Br;

17) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3=methyl, R^2=R^4-R^7 =R^{10}=H, R^8=R^9=R^{11}=methyl, R_{12}=isobutyl, M=Ni, Y=O, X=Br;

18) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3=ethyl, R^2=R^4-R^7 =R^{10}=H, R^8=R^9=R^{11}=methyl, R_{12}=isobutyl, M=Ni, Y=O, X=Br;

19) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3 =isopropyl,

R^2=R^4-R^7 =R^{10}=H, R^8=R^9=R^{11}=methyl, R_{12}=isobutyl, M=Ni, Y=O, X=Br;

20) the diimine-metal complex represented by Formula IIIb, wherein R^1- R^3 =methyl, R^4-R^7 =R^{10}=H, R^8=R^9=R^{11}=methyl, R_{12}=isobutyl, M=Ni, Y=O, X=Br;

21) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3 =methyl, R^2=Br, R^4-R^7 =R^{10}=H, R^8=R^9=R^{11}=methyl, R_{12}=isobutyl, M=Ni, Y=O, X=Br;

22) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3=F, R^2=R^4-R^7 =R^{10}=H, R^8=R^9=R^{11}=methyl, R_{12}=isobutyl, M=Ni, Y=O, X=Br;

23) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3=Cl, R^2=R^4-R^7 =R^{10}=H, R^8=R^9=R^{11}=methyl, R_{12}=isobutyl, M=Ni, Y=O, X=Br;

24) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3=Br, R^2=R^4-R^7 =R^{10}=H, R^8=R^9=R^{11}=methyl, R_{12}=isobutyl, M=Ni, Y=O, X=Br;

25) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3=methyl, R^2=R^4-R^7 =R^{10}=H, R^8=R^9=methyl, R^{11}=bromomethyl, R_{12}=ethyl, M=Ni, Y=O, X=Br;

26) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3=ethyl, R^2=R^4-R^7 =R^{10}=H, R^8=R^9=methyl, R^{11}=bromomethyl, R_{12}=ethyl, M=Ni, Y=O, X=Br;

27) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3 =isopropyl, R^2=R^4-R^7 =R^{10}=H, R^8=R^9=methyl, R^{11}=bromomethyl, R_{12}=ethyl, M=Ni, Y=O, X=Br;

28) the diimine-metal complex represented by Formula IIIb, wherein R^1- R^3 =methyl, R^4-R^7 =R^{10}=H, R^8=R^9=methyl, R^{11}=bromomethyl, R_{12}=ethyl, M=Ni, Y=O, X=Br;

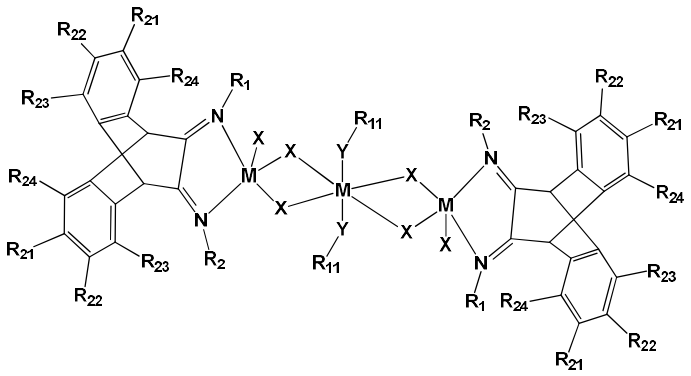
29) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3 =methyl, R^2=Br, R^4-R^7 =R^{10}=H, R^8=R^9=methyl, R^{11}=bromomethyl, R_{12}=ethyl, M=Ni, Y=O, X=Br;

30) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3=F, R^2=R^4-R^7 =R^{10}=H, R^8=R^9=methyl, R^{11}=bromomethyl, R_{12}=ethyl, M=Ni, Y=O, X=Br;

31) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3=Cl, R^2=R^4-R^7 =R^{10}=H, R^8=R^9=methyl, R^{11}=bromomethyl, R_{12}=ethyl, M=Ni, Y=O, X=Br;

32) the diimine-metal complex represented by Formula IIIb, wherein R^1=R^3=Br, R^2=R^4-R^7 =R^{10}=H, R^8=R^9=methyl, R^{11}=bromomethyl, R_{12}=ethyl, M=Ni, Y=O, X=Br.

14. The diimine-metal complex as claimed in claim 1, which is represented by Formula Ic:



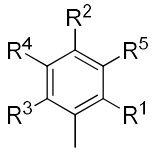
Formula Ic

wherein, R_{21}-R_{24} are each independently selected from the group consisting of hydrogen, halogen, hydroxy, C1-C20 hydrocarbyl with or without a substituent Q and C1-C20 hydrocarbyloxy with or without a substituent Q, and R_{21}-R_{24} are optionally joined to form a ring or ring system;

R_1, R_2, R_{11}, Y, M and X are as defined in claim 1.

15. The diimine-metal complex as claimed in claim 14, having at least one of the following features:

- R_1 and R_2 are independently selected from the group consisting of C1-C20 alkyl with or without a substituent Q and C6-C20 aryl with or without a substituent Q, and preferably R_1 and/or R_2 are/is a group represented by Formula A:



Formula A

wherein, R^1-R^5 are each independently selected from the group consisting of hydrogen, halogen, hydroxy, C1-C20 alkyl with or without a substituent Q, C2-C20 alkenyl with or without a substituent Q, C2-C20 alkynyl with or without a substituent Q, C3-C20 cycloalkyl with or without a substituent Q (according to the definitions in the description, alkyl encompasses cycloalkyl so that the cycloalkyl seems redundant here), C1-C20 alkoxy with or without a substituent Q, C2-C20 alkenoxy with or without a substituent Q, C2-C20 alkynoxy with or without a substituent Q, C6-C20 aryl with or without a substituent Q, C6-C20 aryloxy with or without a substituent Q, C7-C20 aralkyl with or without a substituent Q, C7-C20 aralkoxy with or without a substituent Q, C7-C20 alkaryl with or without a substituent Q and C7-C20 alkaryloxy with or without a substituent Q, and R^1-R^5 are optionally joined to form a ring or ring system;

preferably, R^1-R^5 are each independently selected from the group consisting of hydrogen, halogen, hydroxy, C1-C10 alkyl with or without a substituent Q, C2-C10 alkenyl with or without a substituent Q, C2-C10 alkynyl with or without a substituent Q, C3-C10 cycloalkyl with or without a substituent Q, C1-C10 alkoxy with or without a substituent Q, C2-C10 alkenoxy with

or without a substituent Q, C2-C10 alkynoxy with or without a substituent Q, C3-C10 cycloalkoxy with or without a substituent Q, C6-C15 aryl with or without a substituent Q, C6-C15 aryloxy with or without a substituent Q, C7-C15 aralkyl with or without a substituent Q, C7-C15 aralkoxy with or without a substituent Q, C7-C15 alkaryl with or without a substituent Q and C7-C15 alkaryloxy with or without a substituent Q;

- each M is independently selected from the group consisting of nickel and palladium;

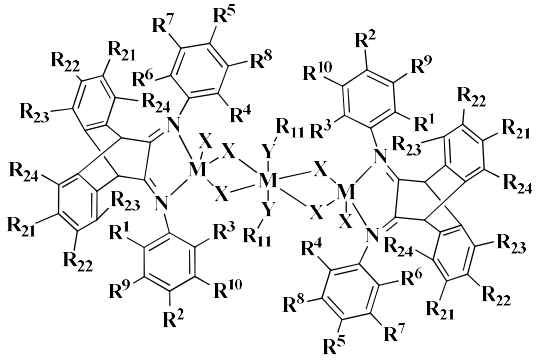
- each Y is independently selected from the group consisting of O and S;

- each X is independently selected from the group consisting of halogen, C1-C10 alkyl with or without a substituent Q and C1-C10 alkoxy with or without a substituent Q, and preferably from the group consisting of halogen, C1-C6 alkyl with or without a substituent Q and C1-C6 alkoxy with or without a substituent Q;

- each R_{11} is independently a C1-C20 alkyl with or without a substituent Q, preferably a C1-C10 alkyl with or without a substituent Q, and more preferably a C1-C6 alkyl with or without a substituent Q; and

- the substituent Q is selected from the group consisting of halogen, hydroxy, C1-C6 alkyl, halogenated C1-C6 alkyl, C1-C6 alkoxy and halogenated C1-C6 alkoxy.

16. The diimine-metal complex as claimed in claim 14 or 15, having a structure represented by Formula IIIc:



Formula IIIc

wherein, R^1-R^{10}, R_{21}-R_{24} are each independently selected from the group consisting of hydrogen, halogen, hydroxy, C1-C20 alkyl with or without a substituent Q, C2-C20 alkenyl with or without a substituent Q, C2-C20 alkynyl with or without a substituent Q, C1-C20 alkoxy with or without a substituent Q, C2-C20 alkenoxy with or without a substituent Q, C2-C20 alkynoxy with or without a substituent Q, C6-C20 aryl with or without a substituent Q, C6-C20 aryloxy with or without a substituent Q, C7-C20 aralkyl with or without a substituent Q, C7-C20 aralkoxy with or without a substituent Q, C7-C20 alkaryl with or without a substituent Q and C7-C20 alkaryloxy with or without a substituent Q, and R^1-R^{10} are optionally joined to form a ring or ring system, R_{21}-R_{24} are optionally joined to form a ring or ring system;

R_{11}, Y, M and X are as defined in claim 14.

17. The diimine-metal complex as claimed in any one of claims 14 to 16, wherein R^1-R^{10}, R_{21}-R_{24} are each independently selected from the group consisting of hydrogen, halogen, hydroxy, C1-C10 alkyl with or without a substituent Q, C2-C10 alkenyl with or without a substituent Q, C2-C10 alkynyl with or without a substituent Q, C3-C10 cycloalkyl with or without a substituent Q, C1-C10 alkoxy with or without a substituent Q, C2-C10 alkenoxy with or without a substituent Q, C2-C10 alkynoxy with or without a substituent Q, C3-C10 cycloalkoxy with or without a substituent Q, C6-C15 aryl with or without a substituent Q, C6-C15 aryloxy with or without a substituent Q, C7-C15 aralkyl with or without a substituent Q, C7-C15 aralkoxy with or without a substituent Q, C7-C15 alkaryl with or without a substituent Q and C7-C15 alkaryloxy with or without a substituent Q;

preferably, R^1-R^{10}, R_{21}-R_{24} are each independently selected from the group consisting of hydrogen, C1-C10 alkyl, halogenated C1-C10 alkyl, C1-C10 alkoxy, halogenated C1-C10 alkoxy and halogen, and more preferably from the group consisting of hydrogen, C1-C6 alkyl, halogenated C1-C6 alkyl, C1-C6 alkoxy, halogenated C1-C6 alkoxy and halogen.

18. The diimine-metal complex as claimed in any one of claims 14 to 17, which is selected from the group consisting of

1) the complex represented by Formula IIIc, wherein R^1=R^3=R^4=R^6=isopropyl, R^2=R^5=R^7-R^{10}=R_{21}=R_{22}=R_{23}=R_{24}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

2) the complex represented by Formula IIIc, wherein R^1=R^3=R^4=R^6=ethyl, R^2=R^5=R^7-R^{10}=R_{21}=R_{22}=R_{23}=R_{24}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

3) the complex represented by Formula IIIc, wherein R^1=R^3=R^4=R^6=methyl, R^2=R^5=R^7-R^{10}=R_{21}=R_{22}=R_{23}=R_{24}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

4) the complex represented by Formula IIIc, wherein R^1- R^6=methyl, R^7-R^{10}=R_{21}=R_{22}=R_{23}=R_{24}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

5) the complex represented by Formula IIIc, wherein R^1=R^3=R^4=R^6=Br, R^2=R^5=R^7-R^{10}=R_{21}=R_{22}=R_{23}=R_{24}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

6) the complex represented by Formula IIIc, wherein R^1=R^3=R^4=R^6=Cl, R^2=R^5=R^7-R^{10}=R_{21}=R_{22}=R_{23}=R_{24}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

7) the complex represented by Formula IIIc, wherein R^1=R^3=R^4=R^6=F, R^2=R^5=R^7-R^{10}=R_{21}=R_{22}=R_{23}=R_{24}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

8) the complex represented by Formula IIIc, wherein R^1=R^3=R^4=R^6=isopropyl, R^2=R^5=R^7-R^{10}=R_{21}=R_{22}=R_{23}=R_{24}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

9) the complex represented by Formula IIIc, wherein R^1=R^3=R^4=R^6=ethyl, R^2=R^5=R^7-R^{10}=R_{21}=R_{22}=R_{23}=R_{24}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

10) the complex represented by Formula IIIc, wherein R^1=R^3=R^4=R^6=methyl, R^2=R^5=R^7-

R^{10}=R_{21}=R_{22}=R_{23}=R_{24}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

11) the complex represented by Formula IIIc, wherein R^1- R^6=methyl, R^7-R^{10}=R_{21}=R_{22}=R_{23}=R_{24}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

12) the complex represented by Formula IIIc, wherein R^1=R^3=R^4=R^6=Br, R^2=R^5=R^7-R^{10}=R_{21}=R_{22}=R_{23}=R_{24}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

13) the complex represented by Formula IIIc, wherein R^1=R^3=R^4=R^6=Cl, R^2=R^5=R^7-R^{10}=R_{21}=R_{22}=R_{23}=R_{24}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

14) the complex represented by Formula IIIc, wherein R^1=R^3=R^4=R^6=F, R^2=R^5=R^7-R^{10}=R_{21}=R_{22}=R_{23}=R_{24}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

15) the complex represented by Formula IIIc, wherein R^1=R^3=R^4=R^6=isopropyl, R^2=R^5=R^7-R^{10}=R_{22}=H, R_{21}=tert-butyl, R_{23}=R_{24}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

16) the complex represented by Formula IIIc, wherein R^1=R^3=R^4=R^6=ethyl, R^2=R^5=R^7-R^{10}=R_{22}=H, R_{21}=tert-butyl, R_{23}=R_{24}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

17) the complex represented by Formula IIIc, wherein R^1=R^3=R^4=R^6=methyl, R^2=R^5=R^7-R^{10}=R_{22}=H, R_{21}=tert-butyl, R_{23}=R_{24}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

18) the complex represented by Formula IIIc, wherein R^1- R^6=methyl, R^7- R^{10}=R_{22}=H, R_{21}=tert-butyl, R_{23}=R_{24}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

19) the complex represented by Formula IIIc, wherein R^1=R^3=R^4=R^6=Br, R^2=R^5=R^7-R^{10}=R_{22}=H, R_{21}=tert-butyl, R_{23}=R_{24}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

20) the complex represented by Formula IIIc, wherein R^1=R^3=R^4=R^6=Cl, R^2=R^5=R^7-R^{10}=R_{22}=H, R_{21}=tert-butyl, R_{23}=R_{24}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

21) the complex represented by Formula IIIc, wherein R^1=R^3=R^4=R^6=F, R^2=R^5=R^7-R^{10}=R_{22}=H, R_{21}=tert-butyl, R_{23}=R_{24}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

22) the complex represented by Formula IIIc, wherein R^1=R^3=R^4=R^6=isopropyl, R^2=R^5=R^7-R^{10}=R_{22}=H, R_{21}=tert-butyl, R_{23}=R_{24}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

23) the complex represented by Formula IIIc, wherein R^1=R^3=R^4=R^6=ethyl, R^2=R^5=R^7-R^{10}=R_{22}=H, R_{21}=tert-butyl, R_{23}=R_{24}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

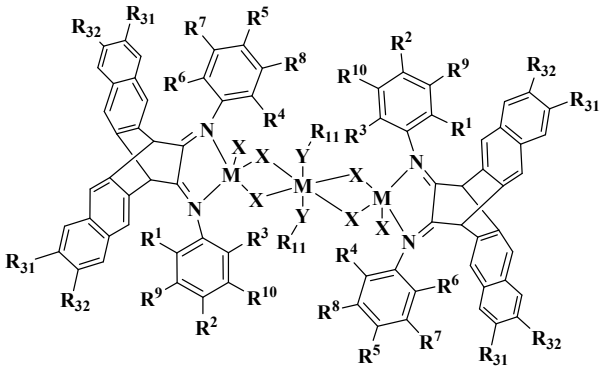
24) the complex represented by Formula IIIc, wherein R^1=R^3=R^4=R^6=methyl, R^2=R^5=R^7-R^{10}=R_{22}=H, R_{21}=tert-butyl, R_{23}=R_{24}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

25) the complex represented by Formula IIIc, wherein R^1- R^6=methyl, R^7- R^{10}=R_{22}=H, R_{21}=tert-butyl, R_{23}=R_{24}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

26) the complex represented by Formula IIIc, wherein R^1=R^3=R^4=R^6=Br, R^2=R^5=R^7-R^{10}=R_{22}=H, R_{21}=tert-butyl, R_{23}=R_{24}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

27) the complex represented by Formula IIIc, wherein R^1=R^3=R^4=R^6=Cl, R^2=R^5=R^7-R^{10}=R_{22}=H, R_{21}=tert-butyl, R_{23}=R_{24}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

28) the complex represented by Formula IIIc, wherein R^1=R^3=R^4=R^6=F, R^2=R^5=R^7-R^{10}=R_{22}=H, R_{21}=tert-butyl, R_{23}=R_{24}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;



(IIIc')

29) the complex represented by Formula (IIIc'), wherein R^1=R^3=R^4=R^6=isopropyl, R^2=R^5=R^7- R^{10}=R_{31}=R_{32}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

30) the complex represented by Formula (IIIc'), wherein R^1=R^3=R^4=R^6=ethyl, R^2=R^5=R^7-R^{10}=R_{31}=R_{32}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

31) the complex represented by Formula (IIIc'), wherein R^1=R^3=R^4=R^6=methyl, R^2=R^5=R^7-R^{10}=R_{31}=R_{32}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

32) the complex represented by Formula (IIIc'), wherein R^1- R^6=methyl, R^7-R^{10}=R_{31}=R_{32}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

33) the complex represented by Formula (IIIc'), wherein R^1=R^3=R^4=R^6=Br, R^2=R^5=R^7-R^{10}=R_{31}=R_{32}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

34) the complex represented by Formula (IIIc'), wherein R^1=R^3=R^4=R^6=Cl, R^2=R^5=R^7-R^{10}=R_{31}=R_{32}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

35) the complex represented by Formula (IIIc'), wherein R^1=R^3=R^4=R^6=F, R^2=R^5=R^7-R^{10}=R_{31}=R_{32}=H, R_{11}=ethyl, M=Ni, Y=O, X=Br;

36) the complex represented by Formula (IIIc'), wherein R^1=R^3=R^4=R^6=isopropyl, R^2=R^5=R^7- R^{10}=R_{31}=R_{32}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

37) the complex represented by Formula (IIIc'), wherein R^1=R^3=R^4=R^6=ethyl, R^2=R^5=R^7-R^{10}=R_{31}=R_{32}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

38) the complex represented by Formula (IIIc'), wherein R^1=R^3=R^4=R^6=methyl, R^2=R^5=R^7-R^{10}=R_{31}=R_{32}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

39) the complex represented by Formula (IIIc'), wherein R^1- R^6=methyl, R^7-R^{10}=R_{31}=R_{32}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

40) the complex represented by Formula (IIIc'), wherein R^1=R^3=R^4=R^6=Br, R^2=R^5=R^7-R^{10}=R_{31}=R_{32}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

41) the complex represented by Formula (IIIc'), wherein R^1=R^3=R^4=R^6=Cl, R^2=R^5=R^7-R^{10}=R_{31}=R_{32}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

42) the complex represented by Formula (IIIc'), wherein R^1=R^3=R^4=R^6=F, R^2=R^5=R^7-R^{10}=R_{31}=R_{32}=H, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

43) the complex represented by Formula (IIIc'), wherein R^1=R^3=R^4=R^6=isopropyl, R^2=R^5=R^7- R^{10}=H R_{31}=R_{32}=R_{11}=ethyl, M=Ni, Y=O, X=Br;

44) the complex represented by Formula (IIIc'), wherein R^1=R^3=R^4=R^6=ethyl, R^2=R^5=R^7-R^{10}=H, R_{31}=R_{32}=R_{11}=ethyl, M=Ni, Y=O, X=Br;

45) the complex represented by Formula (IIIc'), wherein R^1=R^3=R^4=R^6=methyl, R^2=R^5=R^7-R^{10}=H, R_{31}=R_{32}=R_{11}=ethyl, M=Ni, Y=O, X=Br;

46) the complex represented by Formula (IIIc'), wherein R^1- R^6=methyl, R^7- R^{10}=H, R_{31}=R_{32}=R_{11}=ethyl, M=Ni, Y=O, X=Br;

47) the complex represented by Formula (IIIc'), wherein R^1=R^3=R^4=R^6=Br, R^2=R^5=R^7-R^{10}=H, R_{31}=R_{32}=R_{11}=ethyl, M=Ni, Y=O, X=Br;

48) the complex represented by Formula (IIIc'), wherein R^1=R^3=R^4=R^6=Cl, R^2=R^5=R^7-R^{10}=H, R_{31}=R_{32}=R_{11}=ethyl, M=Ni, Y=O, X=Br;

49 the complex represented by Formula (IIIc'), wherein R^1=R^3=R^4=R^6=F, R^2=R^5=R^7-R^{10}=H, R_{31}=R_{32}=R_{11}=ethyl, M=Ni, Y=O, X=Br;

50) the complex represented by Formula (IIIc'), wherein R^1=R^3=R^4=R^6=isopropyl, R^2=R^5=R^7- R^{10}=H, R_{31}=R_{32}=R_{11}=ethyl, M=Ni, Y=O, X=Br;

51) the complex represented by Formula (IIIc'), wherein R^1=R^3=R^4=R^6=ethyl, R^2=R^5=R^7-R^{10}=H, R_{31}=R_{32}=ethyl, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

52) the complex represented by Formula (IIIc'), wherein R^1=R^3=R^4=R^6=methyl, R^2=R^5=R^7-R^{10}=H, R_{31}=R_{32}=ethyl, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

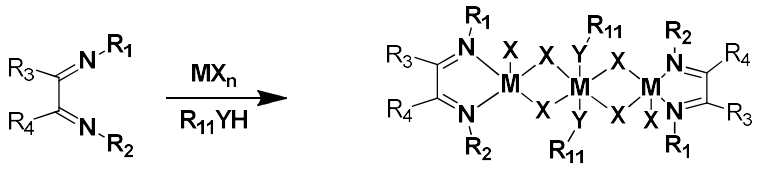
53) the complex represented by Formula (IIIc'), wherein R^1- R^6=methyl, R^7- R^{10}=H, R_{31}=R_{32}=ethyl, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

54) the complex represented by Formula (IIIc'), wherein R^1=R^3=R^4=R^6=Br, R^2=R^5=R^7-R^{10}=H, R_{31}=R_{32}=ethyl, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

55) the complex represented by Formula (IIIc'), wherein R^1=R^3=R^4=R^6=Cl, R^2=R^5=R^7-R^{10}=H, R_{31}=R_{32}=ethyl, R_{11}=isobutyl, M=Ni, Y=O, X=Br;

56) the complex represented by Formula (IIIc'), wherein R^1=R^3=R^4=R^6=F, R^2=R^5=R^7-R^{10}=H, R_{31}=R_{32}=ethyl, R_{11}=isobutyl, M=Ni, Y=O, X=Br.

19. A method for preparing the diimine-metal complex according to claim 1, comprising step 1) reacting a diimine compound represented by Formula IV with MX_n and $R_{11}YH$ to generate the diimine-metal complex represented by Formula I,



Formula IV Formula I

wherein, the R_1, R_2, R_3 and R_4 in Formula IV have the meanings as defined for Formula I in claim 1;

M and X in the MX_n have the meanings as defined for Formula I in claim 1, and n is the number of X satisfying the valence state of M;

and Y and R_{11} in the $R_{11}YH$ have the meanings as defined for Formula I in claim 1.

20. The method as claimed in claim 19, wherein the reaction in step 1) is carried out in an organic solvent, which is preferably a halogenated alkane, and more preferably is selected from the group consisting of dichloromethane, chloroform, 1,2-dichloroethane and mixtures thereof.

21. Use of the diimine-metal complex as claimed in any one of claims 1 to 18 in olefin polymerization.

22. A catalyst for olefin polymerization, comprising the diimine-metal complex as claimed in any one of claims 1 to 18, a co-catalyst and/or a chain transfer agent,

preferably, the cocatalyst is selected from the group consisting of organoaluminum compounds and organoboron compounds; preferably, the organoaluminum compounds are one or more selected from alkylaluminoxanes, aluminum alkyls and alkylaluminum halides; preferably, the organoboron compounds are one or more selected from aromatic hydrocarbyl boron and borates.

23. A process for olefin polymerization, comprising conducting an olefin polymerization reaction in the presence of the diimine-metal complex according to any one of claims 1-18 or the catalyst according to claim 22, preferably the temperature for the polymerization reaction ranging from -78°C to 200°C, preferably from -20°C to 150°C, and the polymerization pressure ranging from 0.01 to 10.0 MPa, preferably from 0.01 to 2.0 MPa.