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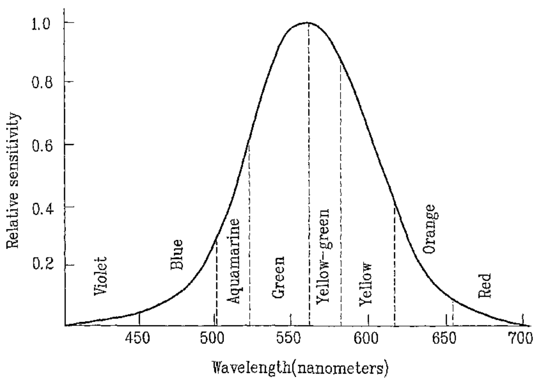
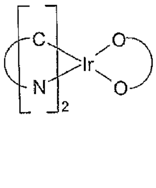
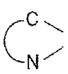
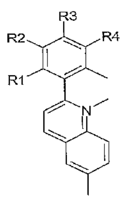
(54) Title: RED PHOSPHORESCENE COMPOUNDS AND ORGANIC ELECTROLUMINESCENCE DEVICES USING THE SAME

(57) Abstract: Red phosphÌrescene compounds and organic electro-luminescence device using the same are disclosed. In an organic electroluminescence device including an anode, a hole injecting layer, a hole transport layer, a light emitting layer, an electron transport layer, an electron injecting layer, and a cathode serially deposited on one another, the organic electroluminescence device may use a compound as a dopant of the light emitting layer.





wherein  represents 

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[DESCRIPTION]

RED PHOSPHORESCENE COMPOUNDS AND ORGANIC ELECTROLUMINESCENCE DEVICES USING THE SAME

Technical Field

The present invention relates to an organic electroluminescence device, and more particularly, to red phosphorescene compounds and organic electroluminescence device using the same. Most particularly, the present invention relates to red phosphorescence being used as a dopant of a light emitting layer of an organic electroluminescence device, which is formed by serially depositing an anode, a hole injecting layer, a hole transport layer, a light emitting layer, an electron transport layer, an electron injecting layer, and a cathode.

Background Art

Recently, as the size of display devices is becoming larger, the request for flat display devices that occupy lesser space is becoming more in demand. Such flat display devices include organic electroluminescence devices, which are also referred to as an organic light emitting diode (OLED). Technology of such organic electroluminescence devices is being developed at a vast rate and various prototypes have already been disclosed.

The organic electroluminescence device emits light when electric charge is injected into an organic layer, which is formed between an electron injecting electrode (cathode) and a hole injecting electrode (anode). More specifically, light is emitted when an electron and a hole form a pair and the newly created electron-hole pair decays. The organic electroluminescence device can be formed on a flexible transparent substrate such as plastic. The organic electro-luminescence device can also be driven under a voltage lower than the voltage required in a plasma display panel or an inorganic electroluminescence (EL) display (i.e., a voltage lower than or equal to 10V). The organic electroluminescence device is advantageous in that it consumes less energy as compared to other display devices and that it provides excellent color representation. Moreover, since the organic EL device can reproduce pictures by using three colors (i.e., green, blue, and red), the organic EL device is widely acknowledged as a next generation color display device that can reproduce vivid images.

The process of fabricating such organic electroluminescence (EL) device will be described as follows:

(1) An anode material is coated over a transparent substrate. Generally, indium tin oxide (ITO) is used as the anode material.

(2) A hole injecting layer (HIL) is deposited on the anode material. The hole injecting layer is formed of a copper phthalocyanine (CuPc) layer having a thickness of 10 nanometers (nm) to 30 nanometers (nm).

(3) A hole transport layer (HTL) is then deposited. The hole transport layer is mostly formed of 4,4'-bis[N-(1-naphtyl)-N-phenylamino]-biphenyl (NPB), which is treated with vacuum evaporation and then coated to have a thickness of 30 nanometers (nm) to 60 nanometers (nm).

(4) Thereafter, an organic light emitting layer is formed. At this point, a dopant may be added if required. In case of green emission, the organic light emitting layer is generally formed of tris(8-hydroxy-quinolate)aluminum (Alq_3) which is vacuum evaporated to have a thickness of 30 nanometers (nm) to 60 nanometers (nm). And, MQD(N-Methylquinacridone) is used as the dopant (or impurity).

(5) Either an electron transport layer (ETL) and an electron injecting layer (EIL) are sequentially formed on the organic emitting layer, or an electron injecting/transport layer is formed on the organic light emitting layer. In case of green emission, the Alq_3 of

step (4) has excellent electron transport ability. Therefore, the electron injecting and transport layers are not necessarily required.

(6) Finally, a layer cathode is coated, and a protective layer is coated over the entire structure.

A light emitting device emitting (or representing) the colors of blue, green, and red, respectively, is decided in accordance with the method of forming the light emitting layer in the above-described structure. As the light emitting material, an exciton is formed by a recombination of an electron and a hole, which are injected from each of the electrodes. A singlet exciton emits fluorescent light, and a triplet exciton emits phosphorescene light. The singlet exciton emitting fluorescent light has a 25% probability of formation, whereas the triplet exciton emitting phosphorescene light has a 75% probability of formation. Therefore, the triplet exciton provides greater light emitting efficiency as compared to the singlet exciton. Among such phosphorescene materials, red phosphorescence material may have greater light emitting efficiency than fluorescent materials. And so, the red phosphorescene material is being researched and studied as an important factor for enhancing the efficiency of the organic electroluminescence device.

When using such phosphorescene materials, high light emitting efficiency, high color purity, and extended durability are required. Most particularly, when using red phosphorescene materials, the visibility decreases as the color purity increases (i.e., the X value of the CIE chromacity coordinates becomes larger), thereby causing difficulty in providing high light emitting efficiency. Accordingly, red phosphorescence material that can provide characteristics of excellent chromacity coordinates (CIE color purity of X=0.65 or more), enhanced light emitting efficiency, and extended durability needs to be developed.

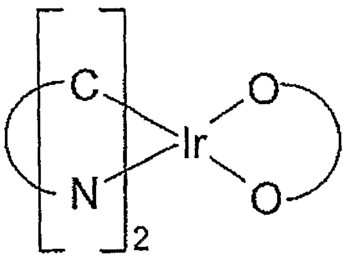
Disclosure of Invention

An object of the present invention devised to solve the problem lies on providing red phosphorescence compounds and an organic electro-luminescence device using the same that substantially obviate one or more problems due to limitations and disadvantages of the related art.

Another object of the present invention devised to solve the problem lies on providing an organic electroluminescence device having high color purity, high brightness, and long durability by combining the compound shown in Formula 1, which is used as a dopant in a light emitting layer of the organic EL device.

The object of the present invention can be achieved by providing a red phosphorescence compound that is indicated as Formula 1 below:

Formula 1



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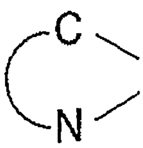
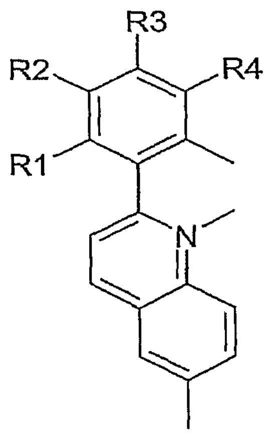
wherein 

represents 

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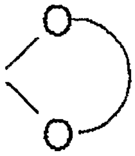
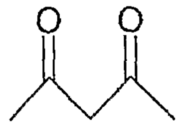
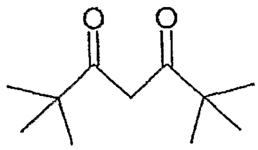
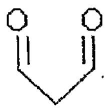
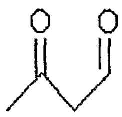
Herein each of R1, R2, R3, and R4 may be one of substituted or non-substituted C1 to C6 alkyl groups with disregard of one another. And, each of the C1 to c6 alkyl groups may be selected from a group consisting of methyl, ethyl, n-propyl, i-propyl, n-butyl, i-butyl, and t-butyl.

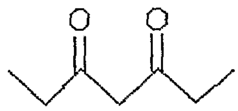
Additionally, 

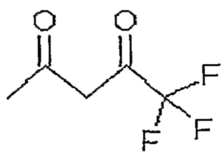
may include 2,4-pentanedione (

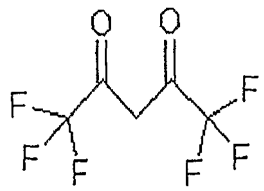
), 2,2,6,6,-tetra-methylheptane-3,5-dione (

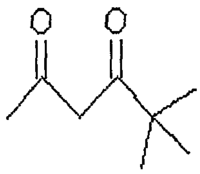
), 1,3-propanedione (

), 1,3-butanedione (

), 3,5-heptanedione (

), 1,1,1-trifluoro-2,4-pentanedione (

), 1,1,1,5,5,5-hexafluoro-2,4-pentanedione (

), and 2,2-dimethyl-3,5-hexanedione (

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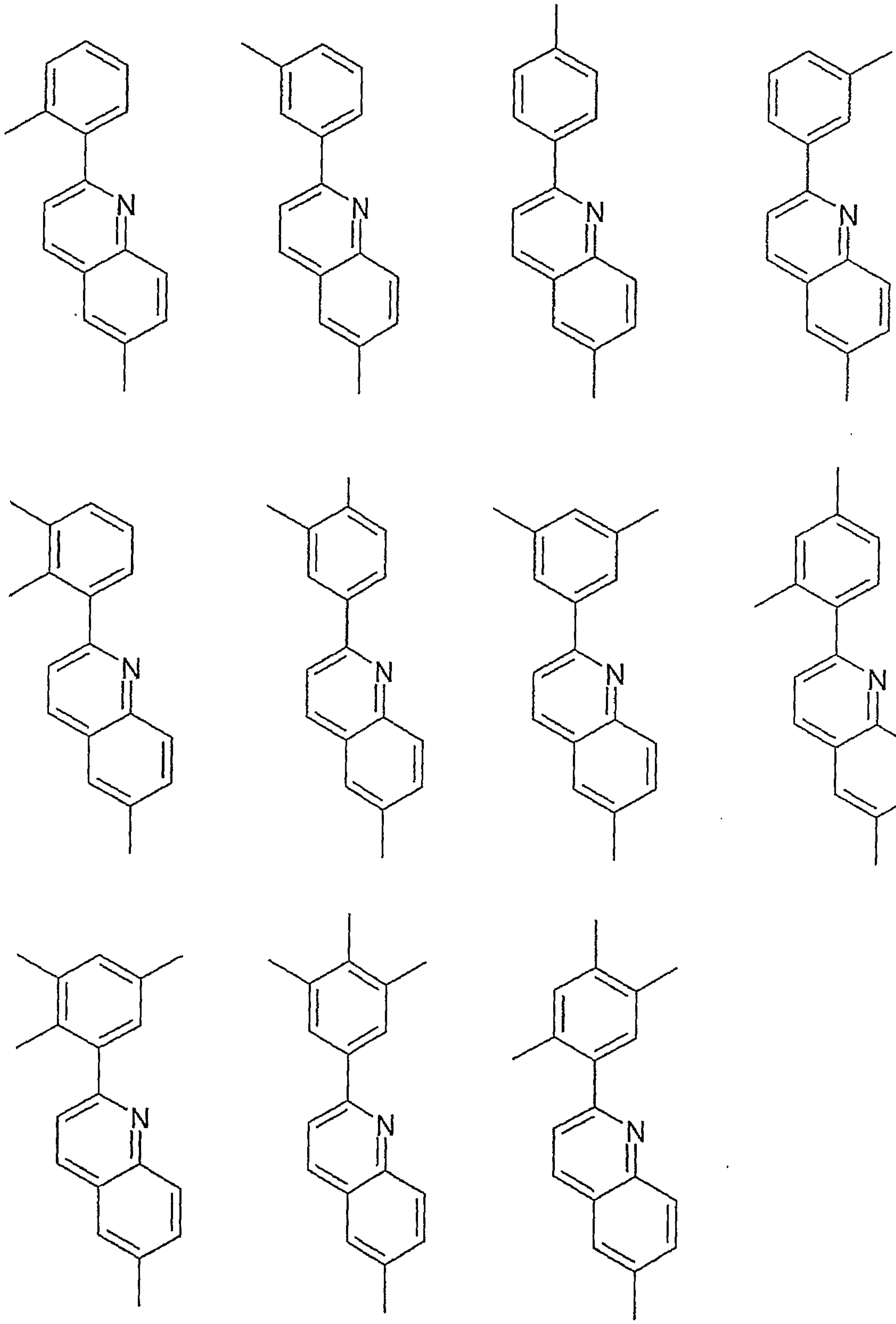
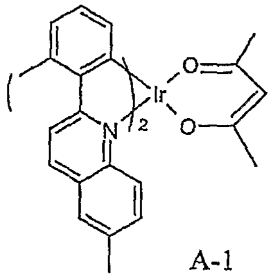
Moveover, 

may be any one of the following chemical formulas:



Furthermore, the Formula 1 may be any one of the following chemical formulas:



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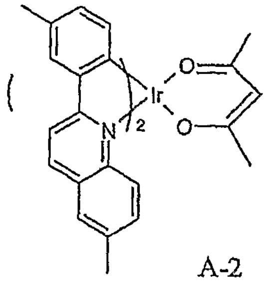

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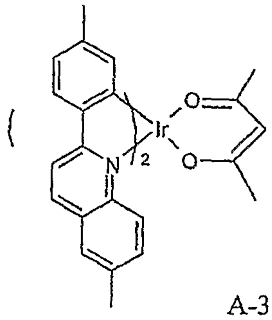

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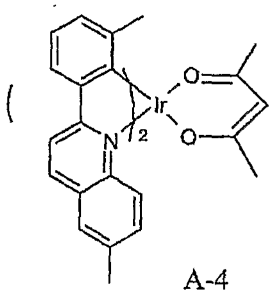

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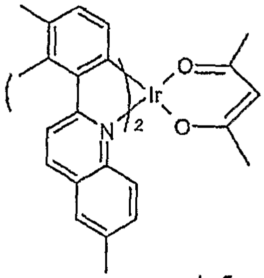

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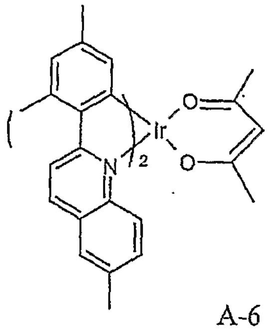

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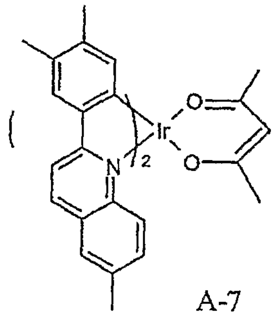

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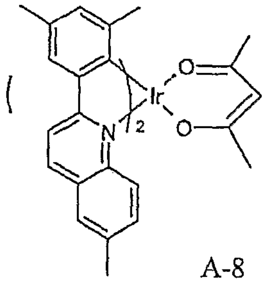

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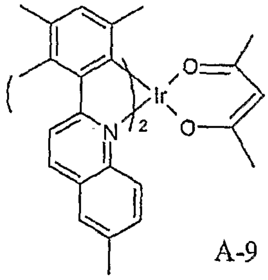

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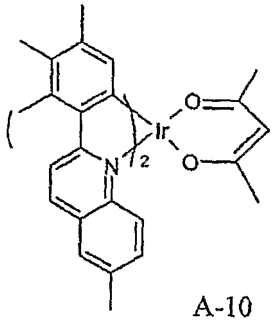

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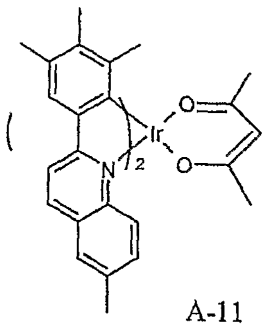

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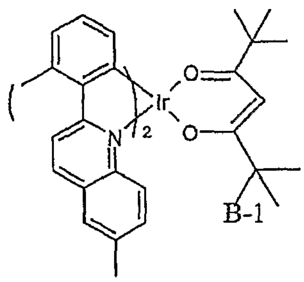
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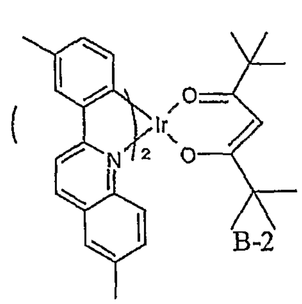
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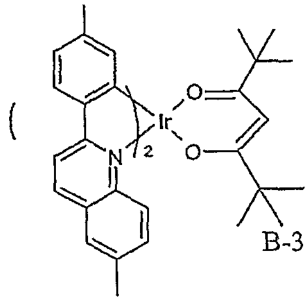
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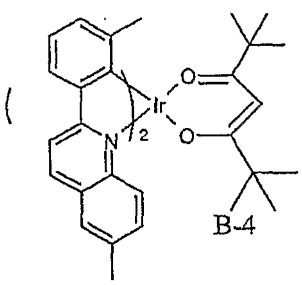
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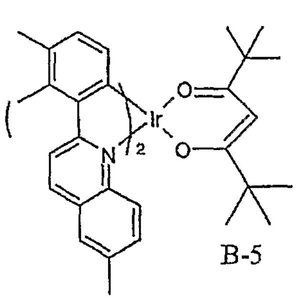
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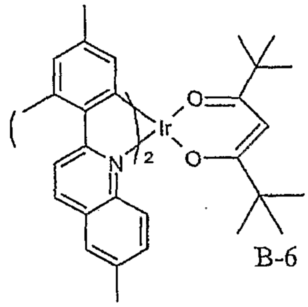
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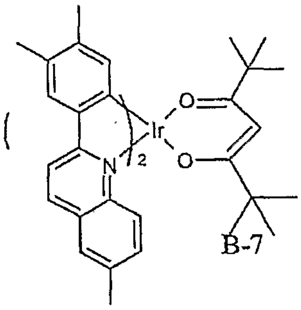
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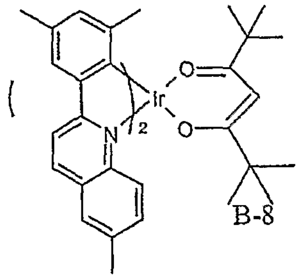
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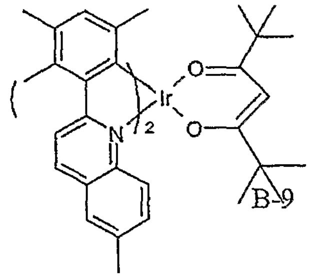
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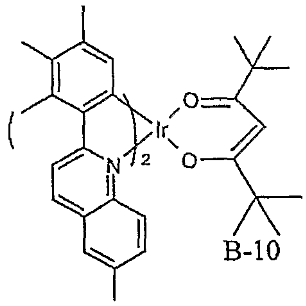
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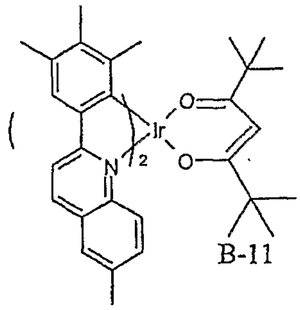

B-11

In another aspect of the present invention, provided herein is an organic electroluminescence device including an anode, a hole injecting layer, a hole transport layer, a light emitting layer, an electron transport layer, an electron injecting layer, and a cathode serially deposited on one another, wherein the organic electroluminescence device may use any one of the above-described formulas as a dopant of the light emitting layer.

Herein, any one of Al and Zn metallic complexes and a carbazole derivative may be used as a host of the light emitting layer, and usage of the dopant may be within the range of 0.1 wt.% to 50 wt.%. The efficiency of the present invention may be provided when the amount of dopant used is within the above-described range. Furthermore, a ligand of each of the Al and Zn metallic complexes may include quinolyl, biphenyl, isoquinolyl, phenyl, methylquinolyl, dimethyl-quinolyl, dimethyl-isoquinolyl, and wherein the carbazole derivative may include CBP.

Brief Description of Drawings

The accompanying drawings, which are included to provide a further understanding of the invention, illustrate embodiments of the invention and together with the description serve to explain the principle of the invention.

In the drawings:

FIG. 1 illustrates a graph showing a decrease in visibility as color purity of an organic EL device increases (i.e., as the X value of chromacity coordinates becomes greater).

FIG. 2 illustrates structural formula of NPB, copper (II) phthalocyanine (CuPc), $(bpt)_2Ir(acac)$, Alq_3, BAlq, and CBP, which are compounds used in embodiments of the present invention.

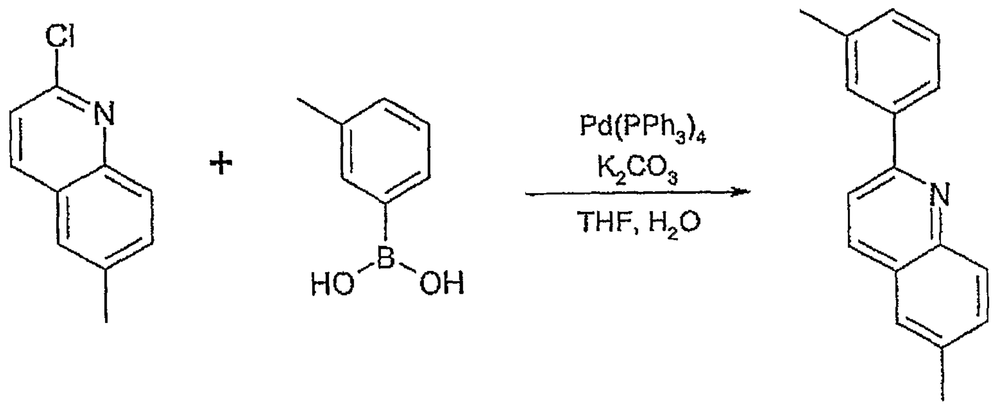
Best Mode for Carrying Out the Invention

Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings.

A method of combining the red phosphorescence compound according to the present invention will now be described. An iridium (lll)(2-(3-methylphenyl)-7-methyl-quinolinato-N, C^2)(2,4-pentanedionate-0,0) compound, which is shown as A-2 among the red phosphorescene compounds used in the organic EL device according to the present invention.

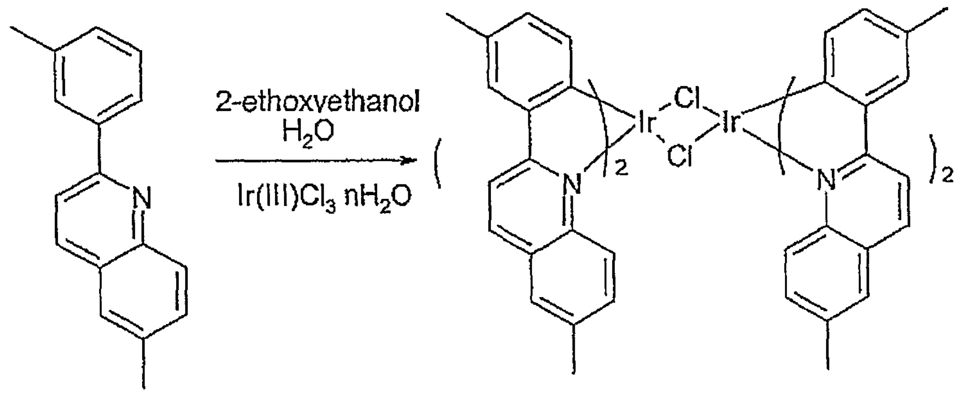
Combination example

1. Combination of 2-(3-methylphenyl)-6-methyl-quinoline



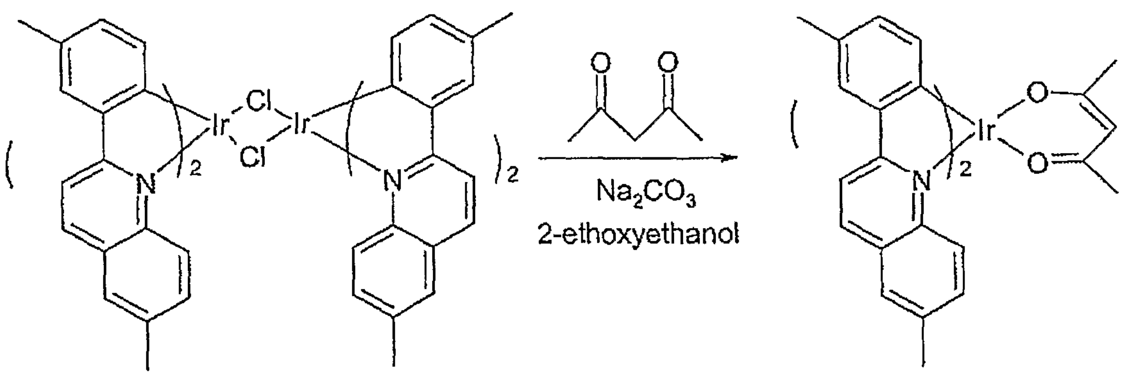
3-methyl-phenyl-boric acid (1.3 mmol), 2-chloro-6- methyl-quinoline (1 mmol), tetrakis (triphenyl phosphine) palladium(0) (0.05 mmol), and potassium carbonate (3 mmol) are dissolved in a two-neck round·bottom flask containing THF (30 ml) and H_2O (10 ml). The mixture is then stirred for 24 hours in a bath of 100 degrees Celsius (℃). Subsequently, when reaction no longer occurs, the THF and toluene are discarded. The mixture is extracted by using dichloromethane and water, which is then treated with vacuum distillation. Then, after filtering the mixture with a silica gel column, a solvent is treated with vacuum distillation. Thereafter, by using dichloromethane and petroleum ether, the mixture is re-crystallized and filtered, thereby yielding solid 2-(3-methylphenyl)-6-methyl-quinoline.

2. Combination of chloro-cross-linked dimer complex



Iridium chloride (1 mmol) and 2-(3-methylphenyl)-6-methyl-quinoline (2.5 mmol) are mixed in a 3:1 liquid mixture (30 ml) of 2-ethoxyethanol and distilled water. Then, the mixture is refluxed for 24 hours. Thereafter, water is added so as to filter the solid form that is produced. Subsequently, the solid form is washed by using methanol and petroleum ether, thereby yielding the chloro-cross-linked dimer complex.

3. Combination of iridium (lll)(2-(3-methylphenyl)-6-methyl-quinolinato-N,C^2)(2,4-pentanedionate-0,0)



A chloro-cross-linked dimer complex (1 mmol), 2,4-pentane dione (3 mmol), and Na_2CO_3 (6 mmol) are mixed into 2-ethoxyethanol (30 ml) and refluxed for 24 hours. The refluxed mixture is then cooled at room temperature. Thereafter, distilled water is added to the cooled mixture, which is filtered so as to yield a solid form. Subsequently, the solid form is dissolved in dichloromethane, which is then filtered by using silica gel.

Afterwards, the dichloromethane is treated with vacuum suction, and the solid form is washed by using methanol and petroleum ether, so as to obtain the chemical compound.

Hereinafter, examples of preferred embodiments will be given to describe the present invention. It will be apparent that the present invention is not limited only to the proposed embodiments.

Embodiments

1. First embodiment

An ITO glass substrate is patterned to have a light emitting area of 3 mm × 3 mm. Then, the patterned ITO glass substrate is washed. Subsequently, the substrate is mounted on a vacuum chamber. The standard pressure is set to 1×10^{-6} torr. Thereafter, layers of organic matter are formed on the ITO substrate in the order of CuPC (200 Å), NPB (400 Å), BAlq + A-2(7%) (200 Å), Alq_3 (300 Å), LiF (5 Å), and Al (1000 Å).

At 0.9 mA, the brightness is equal to 1066 cd/m^2 (6.5 V). At this point, CIE x = 0.646, y = 0.351. Furthermore, the durability (half of the initial brightness) lasts for 5500 hours at 2000 cd/m^2.

2. Second embodiment

An ITO glass substrate is patterned to have a light emitting area of 3 mm × 3 mm. Then, the patterned ITO glass substrate is washed. Subsequently, the substrate is mounted on a vacuum chamber. The standard pressure is set to 1×10^{-6} torr. Thereafter, layers of organic matter are formed on the ITO substrate in the order of CuPC (200 Å), NPB (400 Å), BAlq + A-7(7%) (200 Å), Alq_3 (300 Å), LiF (5 Å), and Al (1000 Å).

At 0.9 mA, the brightness is equal to 1102 cd/m^2 (6.1 V). At this point, CIE x = 0.645, y = 0.352. Furthermore, the durability (half of the initial brightness) lasts for 5800 hours at 2000 cd/m^2.

3. Third embodiment

An ITO glass substrate is patterned to have a light emitting area of 3 mm × 3 mm. Then, the patterned ITO glass substrate is washed. Subsequently, the substrate is mounted on a vacuum chamber. The standard pressure is set to 1 × 10^{-6} torr. Thereafter, layers of organic matter are formed on the ITO substrate in the order of CuPC (200 Å), NPB (400 Å), BAlq + A-9(7%) (200 Å), Alq_3 (300 Å), LiF (5 Å), and Al (1000 Å).

At 0.9 mA, the brightness is equal to 949 cd/m^2 (5.3 V). At this point, CIE x = 0.658, y = 0.339. Furthermore, the durability (half of the initial brightness) lasts for 5000 hours at 2000 cd/m^2.

4. Fourth embodiment

An ITO glass substrate is patterned to have a light emitting area of 3 mm × 3 mm. Then, the patterned ITO glass substrate is washed. Subsequently, the substrate is mounted on a vacuum chamber. The standard pressure is set to 1 × 10^{-6} torr. Thereafter, layers of organic matter are formed on the ITO substrate in the order of CuPC (200 Å), NPB (400 Å), CBP + A-2(7%) (200 Å), Alq_3 (300 Å), LiF (5 Å), and Al (1000 Å).

When forming a hole support layer using BAlq, the brightness is equal to 986 cd/m^2 (6.7 V) at 0.9 mA. At this point, CIE x = 0.641, y = 0.357. Furthermore, the durability (half of the initial brightness) lasts for 4500 hours at 2000 cd/m^2.

<u>Comparison example</u>

An ITO glass substrate is patterned to have a light emitting area of 3 mm × 3 mm. Then, the patterned ITO glass substrate is washed. Subsequently, the substrate is mounted on a vacuum chamber. The standard pressure is set to 1×10^{-6} torr. Thereafter, layers of organic matter are formed on the ITO substrate in the order of CuPC (200 Å), NPB (400 Å), BAlq + $(btp)_2Ir(acac)$(7%) (200 Å), Alq_3 (300 Å), LiF (5 Å), and Al (1000 Å).

At 0.9 mA, the brightness is equal to 780 cd/m^2 (7.5 V). At this point, CIE x = 0.659, y = 0.329. Furthermore, the durability (half of the initial brightness) lasts for 2500 hours at 2000 cd/m^2.

In accordance with the above-described embodiments and comparison example, the characteristics of efficiency, chromacity coordinates, brightness, and durability are shown in Table 1 below.

Table 1

Device	Voltage (V)	Current (mA)	Brightness (cd/m2)	Current Efficiency (cd/A)	Power Efficiency (1 m/W)	CIE (X)	CIE (Y)	Durability(h) 1/2 of initial brightness
First Embodiment	6.5	0.9	1066	10.66	5.2	0.65	0.34	5500
Second Embodiment	6.1	0.9	1102	11.02	5.7	0.65	0.35	5800
Third Embodiment	5.3	0.9	949	9.49	5.6	0.66	0.34	5000
Fourth Embodiment	6.7	0.9	986	9.86	4.6	0.64	0.36	4500
Comparison Example	7.5	0.9	780	7.8	3.3	0.66	0.33	2500

As shown in Table 1, the device is operated with high efficiency at a low voltage even when the color purity is high (CIE(X) ≥0.65). Furthermore, the current efficiency of the second embodiment has increased by 70% or more as compared to the comparison example. Additionally, the durability of the second embodiment has increased to twice that of the comparison example.

Table 2 below shows the characteristics of efficiency, chromacity coordinates, and brightness in accordance with the increase in voltage and electric current in the organic electroluminescence device according to the second embodiment of the present invention.

Table 2

Voltage (V)	Current (A(mA/cm^2)	Brightness (cd/m^2)	Current Efficiency (cd/A)	Power Efficiency (1 m/W)	CIE (X)	CIE (Y)
4.58	1.111	131.8	11.86	8.14	0.65	0.35
5.10	3.333	458.2	13.75	8.47	0.65	0.35
5.49	6.666	958.6	14.38	8.22	0.65	0.35
6.07	16.666	2336	14.02	7.26	0.65	0.35
6.52	33.333	4424	13.27	6.39	0.65	0.35
7.01	88.888	10160	11.43	5.12	0.64	0.35

As shown in Table 2, the second embodiment provides excellent efficiency, and the chromacity coordinates according to the driving voltage also maintains high color purity.

It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention cover the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

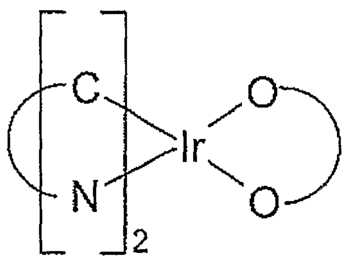
Industrial Applicability

By using the compound shown in Formula 1 as the light emitting layer of the organic electroluminescence device, the present invention provides an organic electroluminescence device having excellent color purity and brightness, and an extended durability.

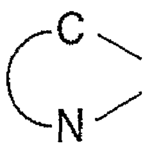
[CLAIMS]

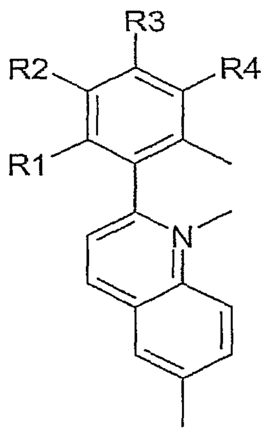
1. A red phosphorescence compound being indicated as Formula 1 below:

Formula 1



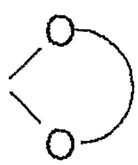
,

wherein 

represents 

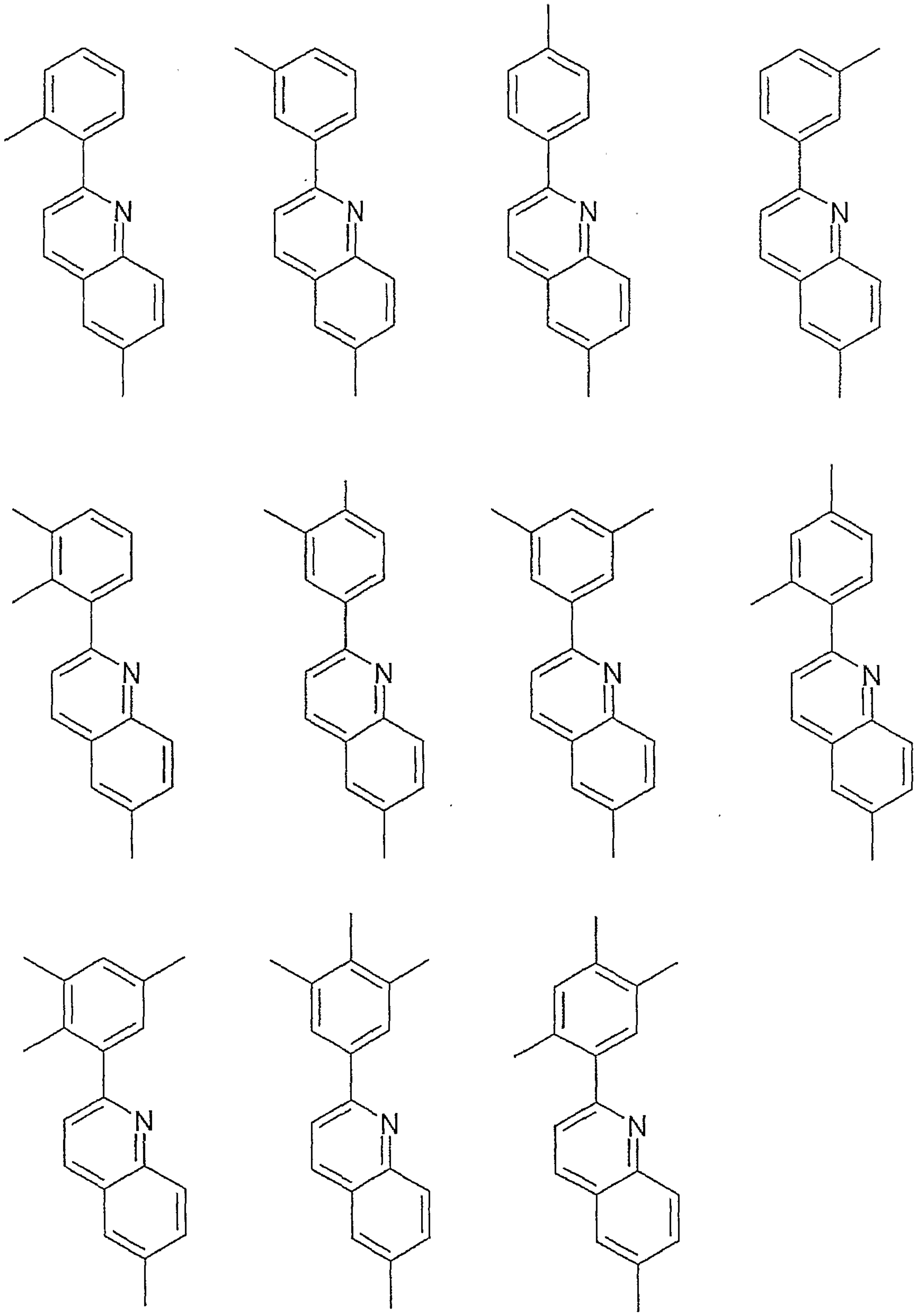
2. The red phosphorescence compound of claim 1, wherein each of R1, R2, R3, and R4 is one of substituted or non-substituted C1 to C6 alkyl groups with disregard of one another.

3. The red phosphorescence compound of claim 2, wherein each of the C1 to c6 alkyl groups is selected from a group consisting of methyl, ethyl, n-propyl, i-propyl, n-butyl, i-butyl, and t-butyl.

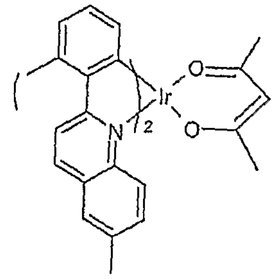
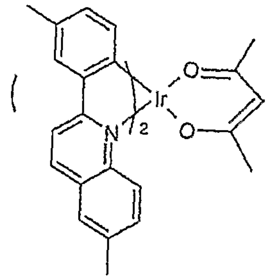
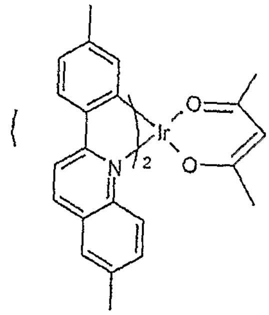
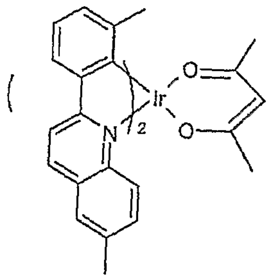
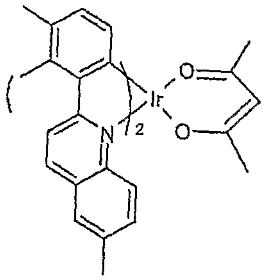
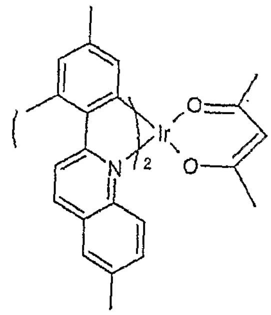
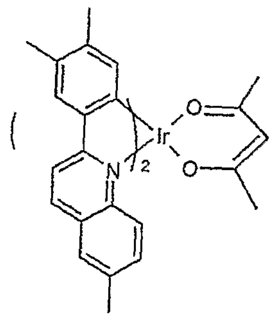
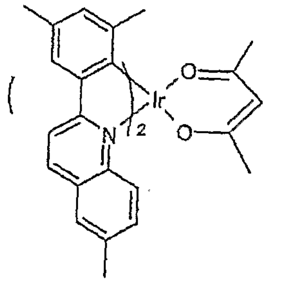
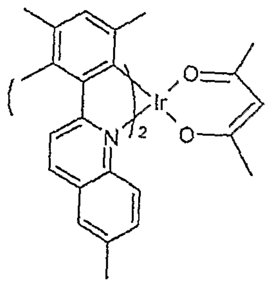
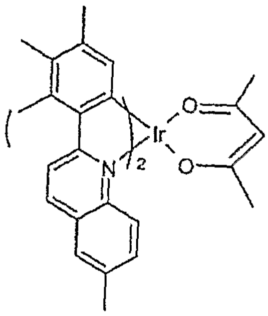
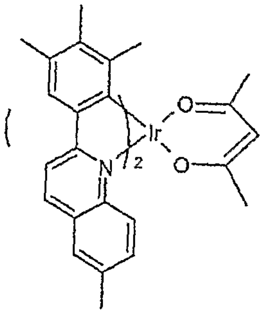
4. The red phosphorescence compound of claim 1, wherein 

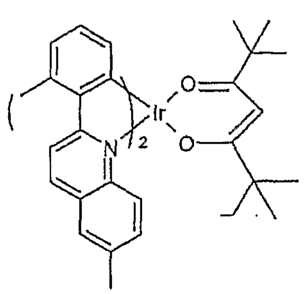
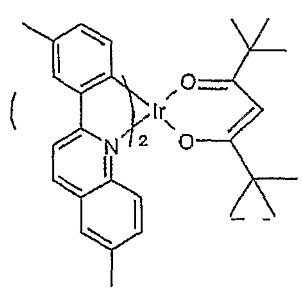
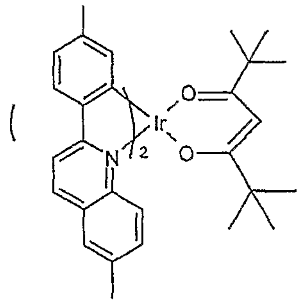
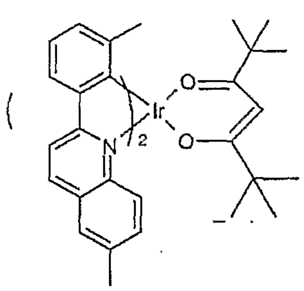
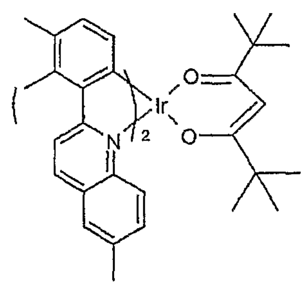
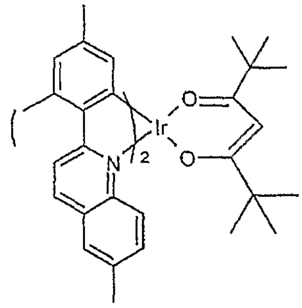
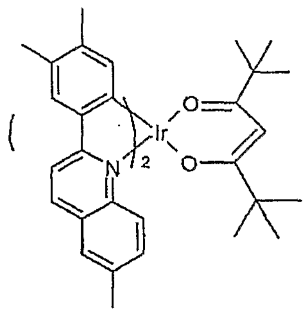
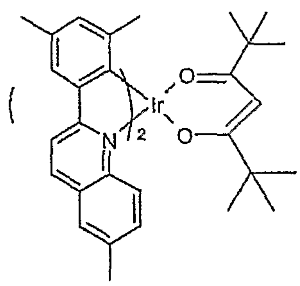
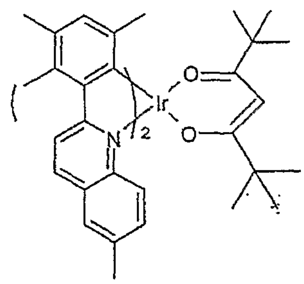
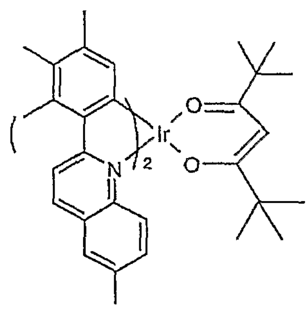
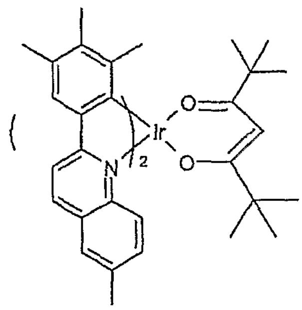
comprises 2,4-pentanedione, 2,2,6,6,-tetra-methylheptane-3,5-dione, 1,3-propanedione, 1,3-butanedione, 3,5-heptanedione, 1,1,1-trifluoro-2,4-pentanedione, 1,1,1,5,5,5-hexafluoro-2,4-pentanedione, and 2,2-dimethyl-3,5-hexanedione.

5. The red phosphorescence compound of claim 1, wherein  is any one of the following chemical formulas:



6. The red phosphorescence compound of claim 1, wherein the Formula 1 is any one of the following chemical formulas:

7. In an organic electroluminescence device comprising an anode, a hole injecting layer, a hole transport layer, a light emitting layer, an electron transport layer, an electron injecting layer, and a cathode serially deposited on one another, the organic electroluminescence device using a compound of any one of claim 1 to claim 6 as a dopant of the light emitting layer.

8. The organic electroluminescence device of claim 7, wherein any one of Al and

Zn metallic complexes and carbazole derivatives is used as a host of the light emitting layer.

9. The organic electroluminescence device of claim 7, wherein any one of Al and Zn metallic complexes and a carbazole derivative is used as a host of the light emitting layer, and wherein usage of the dopant within the range of 0.1 wt.% to 50 wt.%.

10. The organic electroluminescence device of claim 8, wherein a ligand of each of the Al and Zn metallic complexes comprises quinolyl, biphenyl, isoquinolyl, phenyl, methylquinolyl, dimethylquinolyl, dimethyl-isoquinolyl, and wherein the carbazole derivative comprises CBP.

FIG. 1

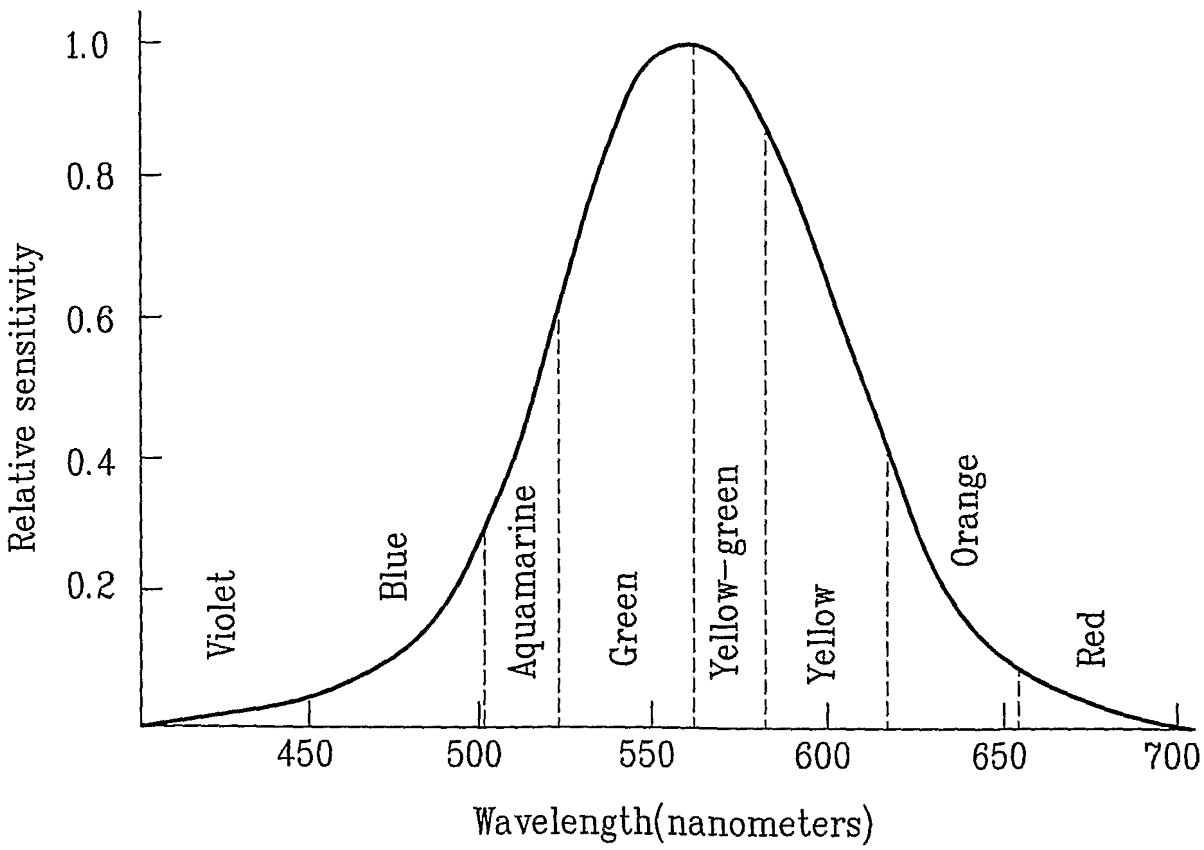
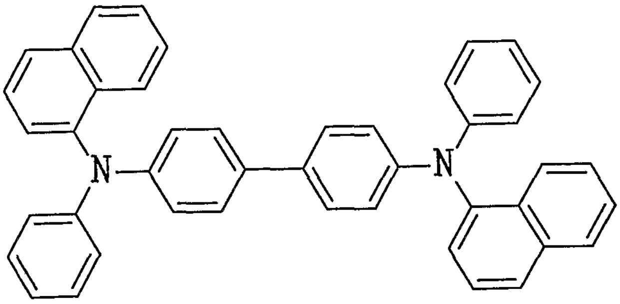
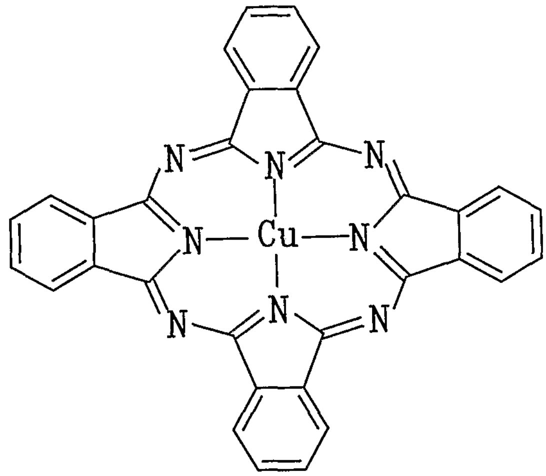

1.0
0.8
0.6
0.4
0.2
Relative sensitivity
Violet
Blue
Aquamarine
Green
Yellow-green
Yellow
Orange
Red
450
500
550
600
650
700
Wavelength(nanometers)

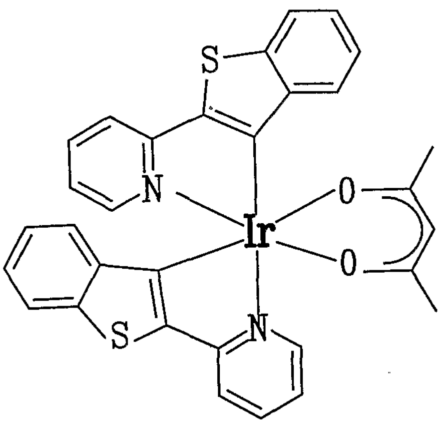
FIG. 2



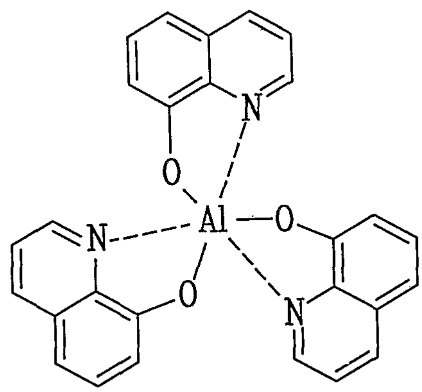
NPB



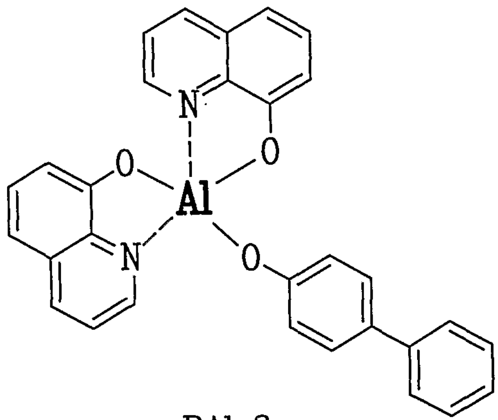
Copper(II) phthalocyanine (CuPc)



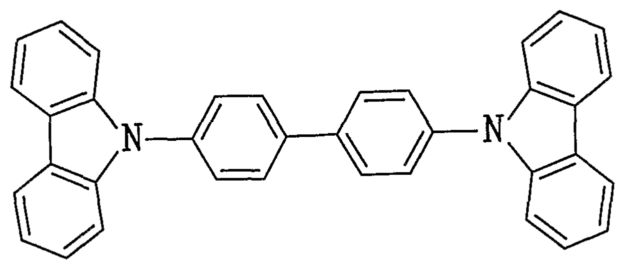
$(btp)_2Ir(acac)$



Alq3



BAlq3



CBP

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR 2005/001413

A. CLASSIFICATION OF SUBJECT MATTER

IPC[7]: C09K 11/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC[7]: C09K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, EPODOC, PAJ, Internet, CA, Pubmed

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US2004127710A1 (PARK et al) 1 July 2004 (01.07.2004) **claims, figure 1 and paragraphs [0062] to [0078]*.*	1-10
	--	
X	WO2003/040256A2 (E.I. DU PONT DE NEMOURS AND COMPANY) 15 May 2003 (15.05.2003) **figure 2*.*	5
	--	
X	Lamansky S, et al. "Synthesis and characterization of phosphorescent cyclo-metalated iridium complexes." Inorg Chem. 2001 Mar 26;40(7):1704-11. **figure 1*.*	1-10
	--	

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 November 2005 (15.11.2005)	1 December 2005 (01.12.2005)

Name and mailing address of the ISA/ AT	Authorized officer
Austrian Patent Office Dresdner Straße 87, A-1200 Vienna	GÖRNER W.
Facsimile No. +43 / 1 / 534 24 / 535	Telephone No. +43 / 1 / 534 24 / 558

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP2003253145 (JSR CORP) 28 February 2002 (28.02.2002) *abstact, figure above paragraph [0053] of the originally filed document*.	1-10

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/KR 2005/001413

Patent document cited in search report			Publication date	Patent family member(s)			Publication date
	A					none	
JP	A	2003253145A2				none	
US	A1	2004127710	2004-07-01	CN	A	1517427	2004-08-04
				JP	A	2004210779	2004-07-29

patsnap

专利名称(译)	红色磷光化合物和使用其的有机电致发光器件		
公开(公告)号	EP1856226A1	公开(公告)日	2007-11-21
申请号	EP2005744886	申请日	2005-05-13
申请(专利权)人(译)	LG电子株式会社.		
当前申请(专利权)人(译)	LG电子株式会社.		
[标]发明人	KIM JUNG KEUN PARK CHUN GUN SEO JEONG DAE JEONG HYUN CHEOL LEE KYUNG HOON PARK SANG TAE 209 1103 MUJIGAEMAEUL LG APT		
发明人	KIM, JUNG KEUN PARK, CHUN GUN SEO, JEONG DAE JEONG, HYUN CHEOL LEE, KYUNG HOON PARK, SANG TAE 209-1103, MUJIGAEMAEUL LG APT.		
IPC分类号	C09K11/06 C07F15/00 H01L51/00 H01L51/50 H05B33/14		
CPC分类号	C07F15/0033 C09K11/06 C09K2211/1029 C09K2211/185 H01L51/0081 H01L51/0085 H01L51/5016 H05B33/14 Y10S428/917 B05B12/002 E03D9/08		
优先权	1020050019181 2005-03-08 KR		
其他公开文献	EP1856226B1		
外部链接	Espacenet		

摘要(译)

公开了红色磷光体化合物和使用其的有机电致发光器件。在包括阳极，空穴注入层，空穴传输层，发光层，电子传输层，电子注入层和阴极彼此串联沉积的有机电致发光器件中，有机电致发光器件可以使用化合物作为发光层的掺杂剂。