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(71) 출원인

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(74) 대리인

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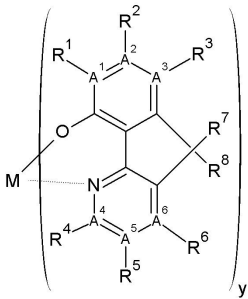
전체 청구항 수 : 총 11 항

(54) 금속 착체 화합물 및 이를 포함하는 유기 발광 장치

(57) 요약

하기 화학식 1로 표시되는 금속 착체 화합물, 그리고 이를 포함하는 유기 발광 장치가 제공된다.

[화학식 1]



(상기 화학식 1에서, M, R¹ 내지 R⁸, A¹ 내지 A⁶, 및 y는 명세서에 정의된 바와 같다.)

대표도 - 도1

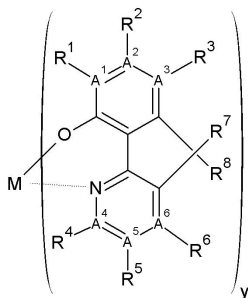
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특허청구의 범위

청구항 1

하기 화학식 1로 표시되는 금속 착체 화합물.

[화학식 1]



(상기 화학식 1에서,

M은 2족 또는 3족의 금속 이온이며,

R^1 내지 R^8 은 서로 동일하거나 상이하며, 수소 원자, 할로젠 원자, 히드록시기, 치환 또는 비치환된 C1 내지 C20 알킬기이고, 치환 또는 비치환된 C2 내지 C20 알케닐기, 치환 또는 비치환된 C2 내지 C20 알키닐기, 치환 또는 비치환된 C1 내지 C20 알콕시기, 치환 또는 비치환된 C3 내지 C30 사이클로알킬기, 치환 또는 비치환된 C3 내지 C30 사이클로알케닐기, 치환 또는 비치환된 C3 내지 C30 사이클로알키닐기, 치환 또는 비치환된 C2 내지 C30 헤테로사이클로알킬기, 치환 또는 비치환된 C2 내지 C30 헤테로사이클로알케닐기, 치환 또는 비치환된 C2 내지 C30 헤테로사이클로알키닐기, 치환 또는 비치환된 C6 내지 C30 아릴기, 치환 또는 비치환된 C6 내지 C30 아릴옥시기, 치환 또는 비치환된 C3 내지 C30 헤테로아릴기, 아민기, 에스테르기, 카르복실기, 니트로기 또는 시아노기일 수 있고,

R^1 및 R^2 , R^2 및 R^3 , R^4 및 R^5 , 그리고 R^5 및 R^6 은 각각 서로 결합하여 치환 또는 비치환된 C6 내지 C30 아릴기, 치환 또는 비치환된 C6 내지 C30 아릴옥시기, 치환 또는 비치환된 C3 내지 C30 헤테로아릴기를 형성할 수도 있으며,

A^1 내지 A^6 은 서로 동일하거나 상이하며, 탄소 원자 또는 질소 원자이며,

y는 2 또는 3이다.)

청구항 2

제1항에 있어서,

상기 화학식 1에서의 R^1 내지 R^8 은 서로 동일하거나 상이하며, 수소 원자, 할로젠 원자, 치환 또는 비치환된 C1 내지 C20 알킬기이고, 치환 또는 비치환된 C6 내지 C30 아릴기, 치환 또는 비치환된 C6 내지 C30 아릴옥시기, 치환 또는 비치환된 C3 내지 C30 헤테로아릴기, 아민기, 에스테르기, 니트로기 또는 시아노기일 수 있고,

R^1 및 R^2 , R^2 및 R^3 , R^4 및 R^5 , 그리고 R^5 및 R^6 은 각각 서로 결합하여 치환 또는 비치환된 C6 내지 C30 아릴기, 치환 또는 비치환된 C6 내지 C30 아릴옥시기, 치환 또는 비치환된 C3 내지 C30 헤테로아릴기를 형성할 수 있는 것인 금속 착체 화합물.

청구항 3

제1항에 있어서,

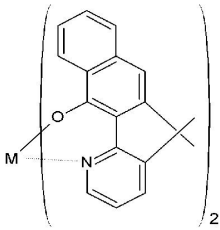
상기 화학식 1에서의 M은 Be, Zn, Mg, Ca, Y, B, Al, Ga, In 또는 이들의 조합인 것인 금속 착체 화합물.

청구항 4

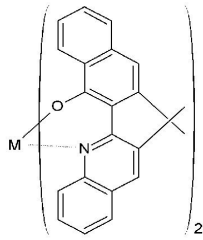
제1항에 있어서,

상기 금속 착체 화합물은 하기 화학식 2-1 내지 2-147 중 어느 하나로 표시되는 것인 금속 착체 화합물.

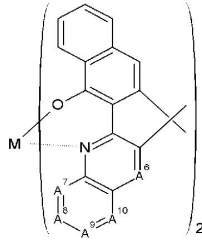
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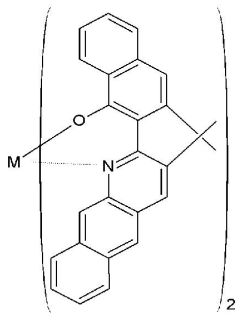
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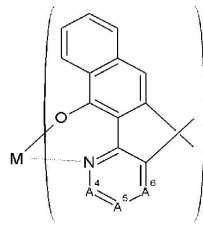
[화학식 2-3]



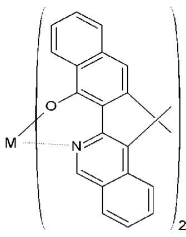
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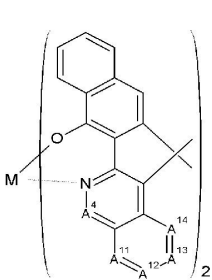
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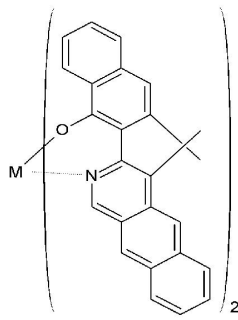
[화학식 2-6]



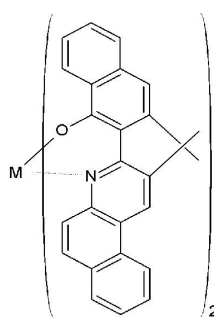
[화학식 2-7]



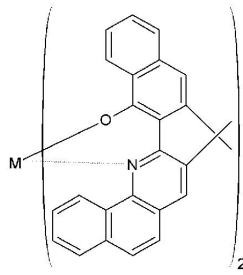
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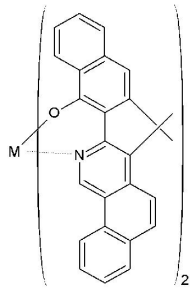
[화학식 2-9]



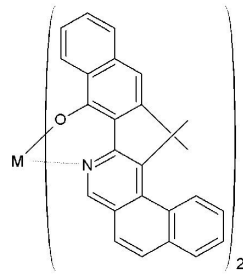
[화학식 2-10]



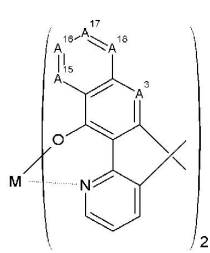
[화학식 2-11]



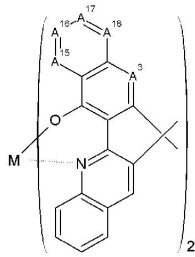
[화학식 2-12]



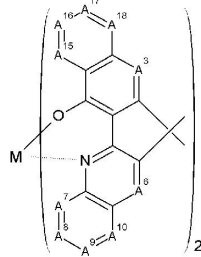
[화학식 2-13]



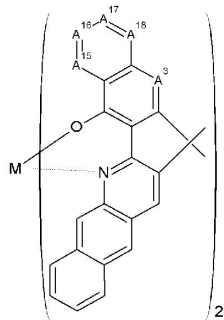
[화학식 2-14]



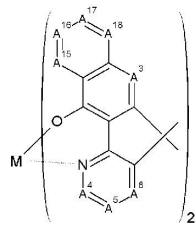
[화학식 2-15]



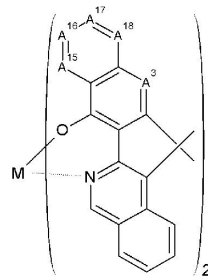
[화학식 2-16]



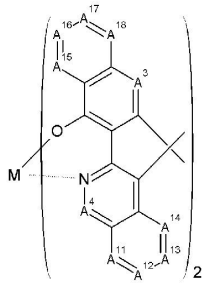
[화학식 2-17]



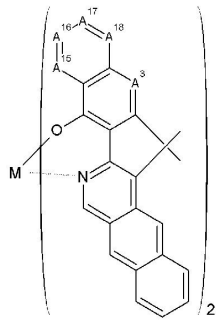
[화학식 2-18]



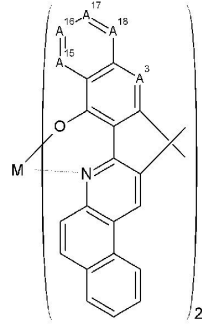
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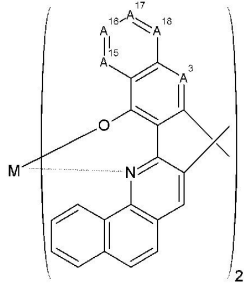
[화학식 2-20]



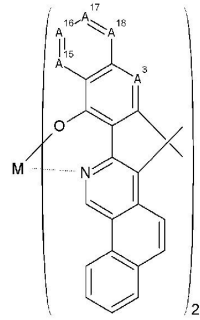
[화학식 2-21]



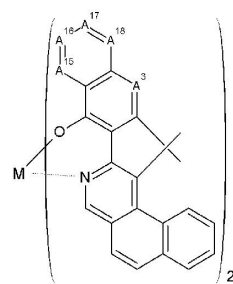
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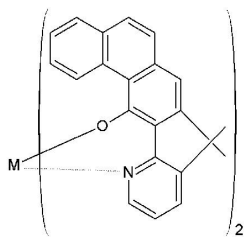
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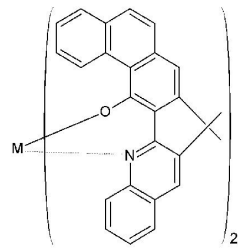
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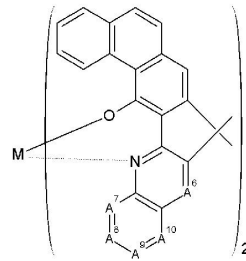
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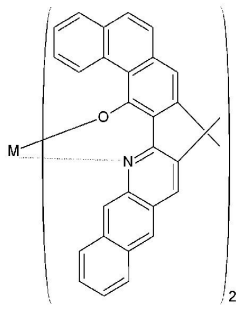
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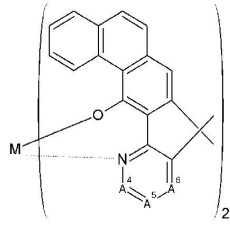
[화학식 2-27]



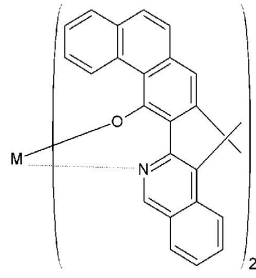
[화학식 2-28]



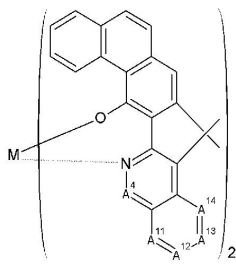
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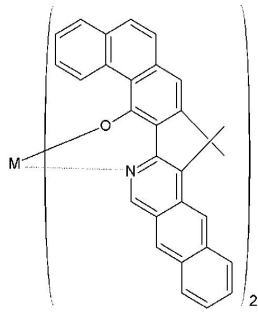
[화학식 2-30]



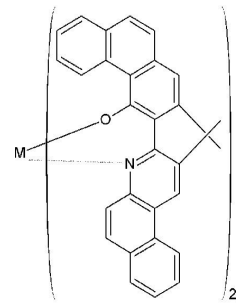
[화학식 2-31]



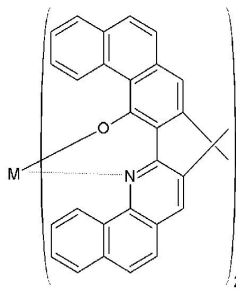
[화학식 2-32]



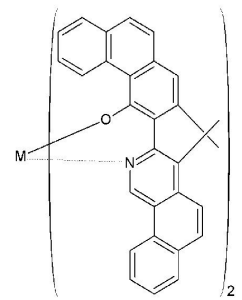
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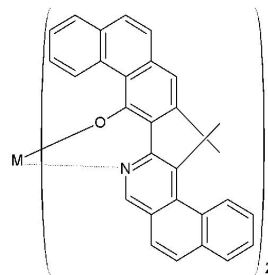
[화학식 2-34]



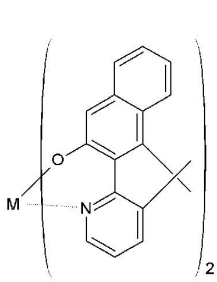
[화학식 2-35]



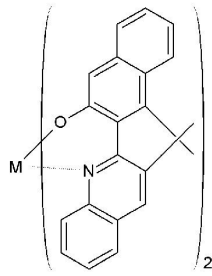
[화학식 2-36]



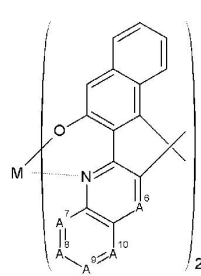
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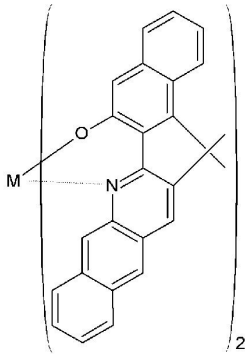
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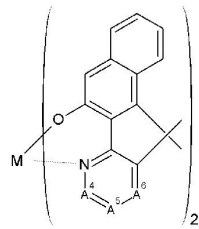
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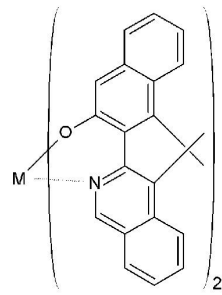
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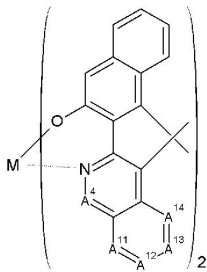
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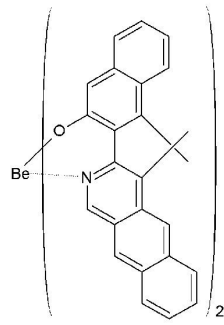
[화학식 2-42]



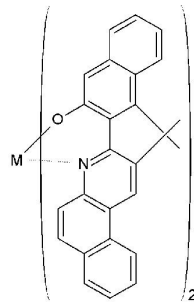
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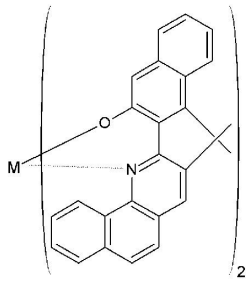
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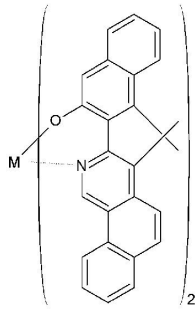
[화학식 2-45]



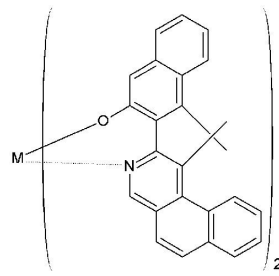
[화학식 2-46]



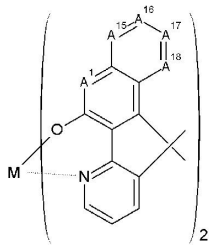
[화학식 2-47]



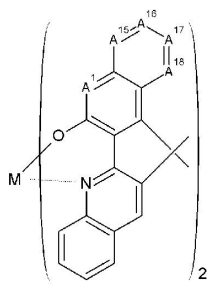
[화학식 2-48]



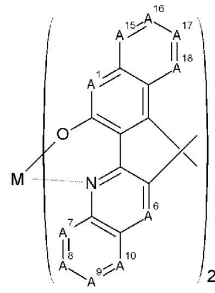
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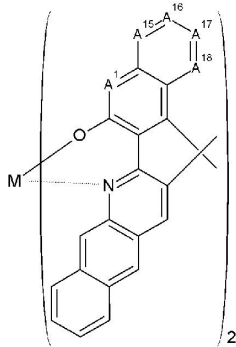
[화학식 2-50]



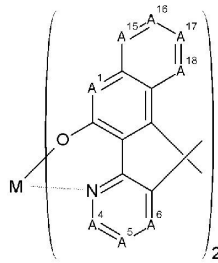
[화학식 2-51]



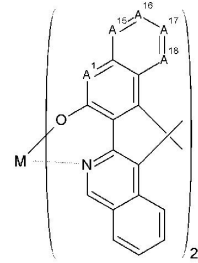
[화학식 2-52]



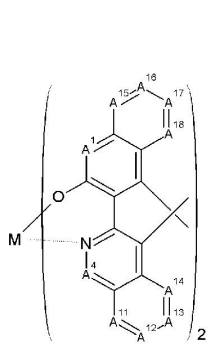
[화학식 2-53]



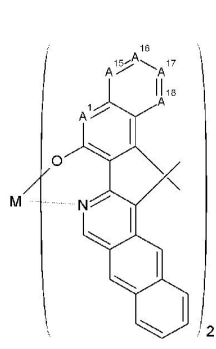
[화학식 2-54]



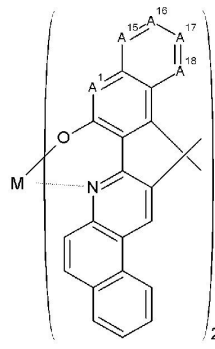
[화학식 2-55]



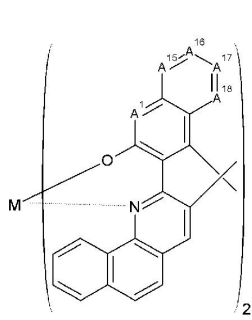
[화학식 2-56]



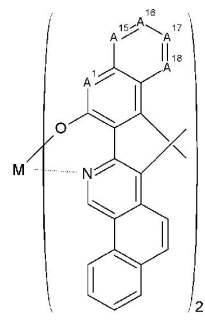
[화학식 2-57]



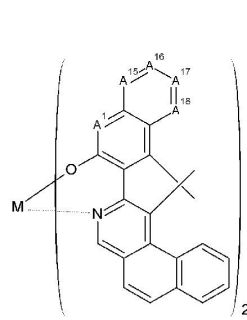
[화학식 2-58]



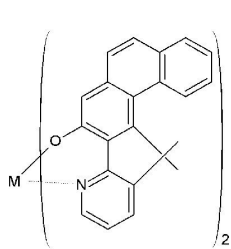
[화학식 2-59]



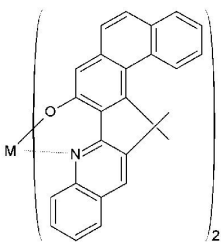
[화학식 2-60]



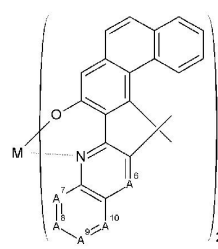
[화학식 2-61]



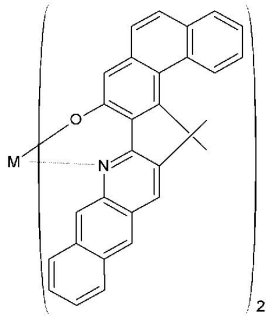
[화학식 2-62]



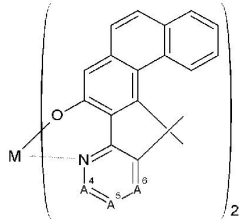
[화학식 2-63]



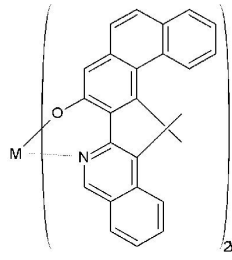
[화학식 2-64]



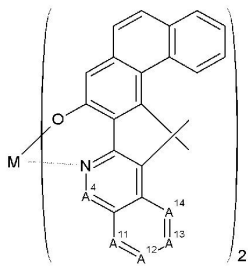
[화학식 2-65]



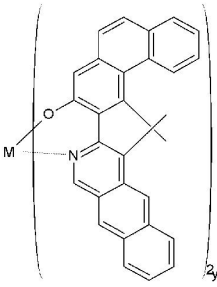
[화학식 2-66]



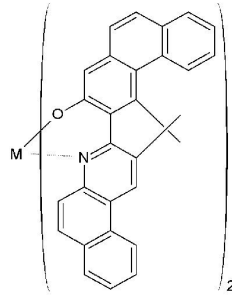
[화학식 2-67]



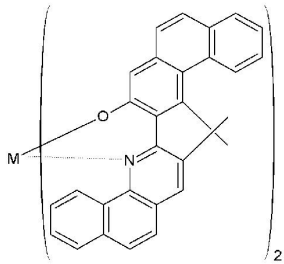
[화학식 2-68]



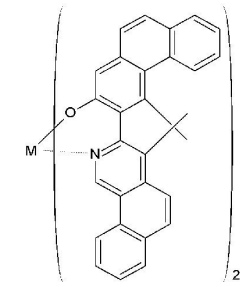
[화학식 2-69]



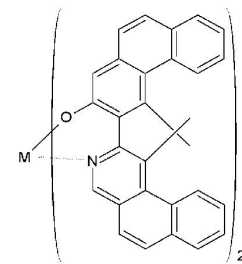
[화학식 2-70]



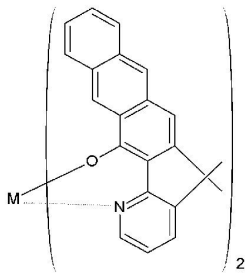
[화학식 2-71]



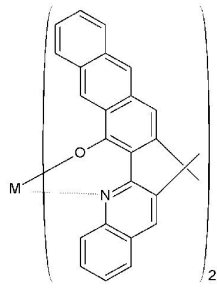
[화학식 2-72]



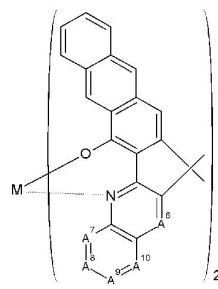
[화학식 2-73]



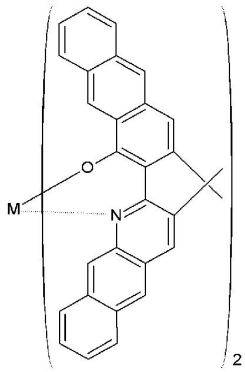
[화학식 2-74]



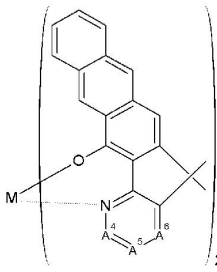
[화학식 2-75]



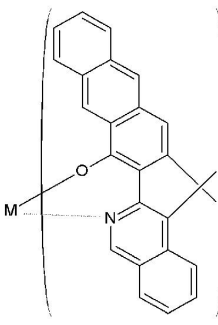
[화학식 2-76]



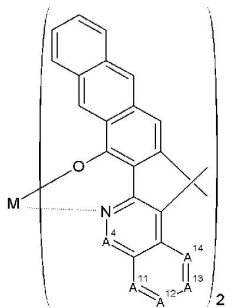
[화학식 2-77]



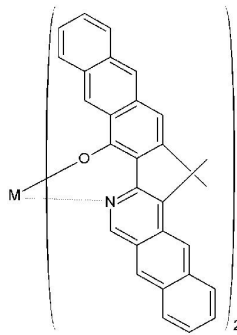
[화학식 2-78]



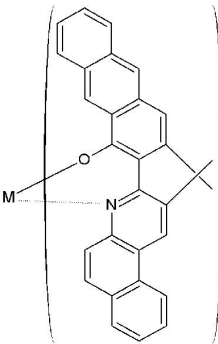
[화학식 2-79]



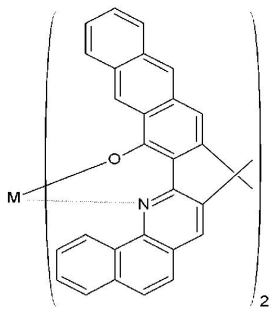
[화학식 2-80]



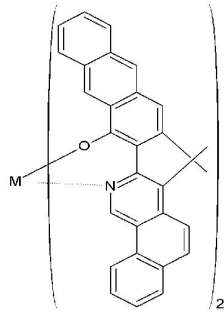
[화학식 2-81]



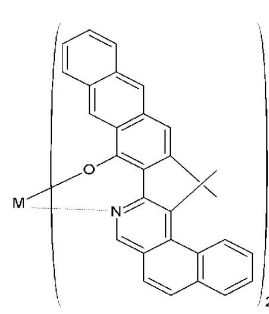
[화학식 2-82]



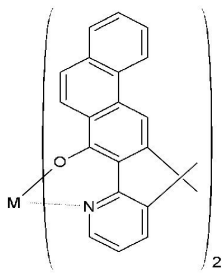
[화학식 2-83]



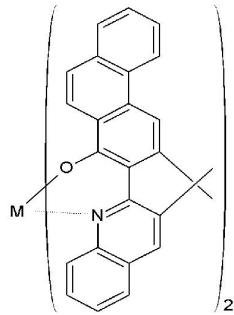
[화학식 2-84]



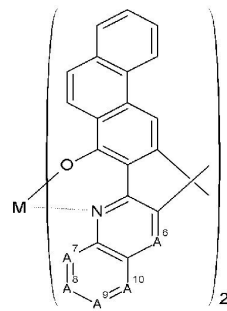
[화학식 2-85]



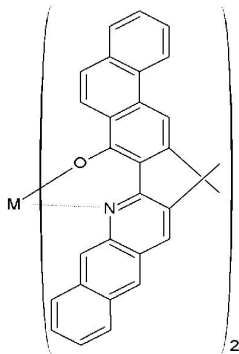
[화학식 2-86]



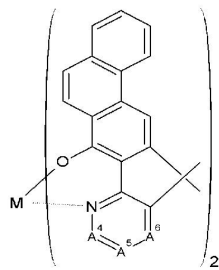
[화학식 2-87]



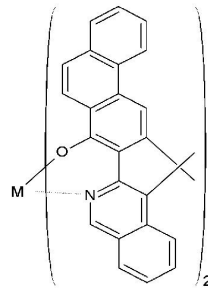
[화학식 2-88]



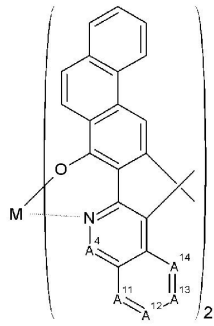
[화학식 2-89]



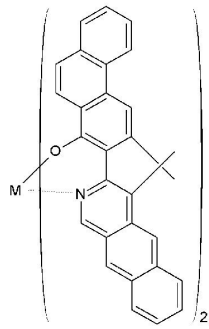
[화학식 2-90]



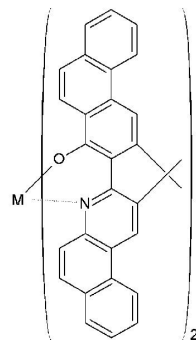
[화학식 2-91]



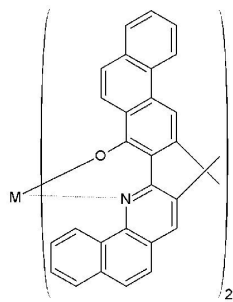
[화학식 2-92]



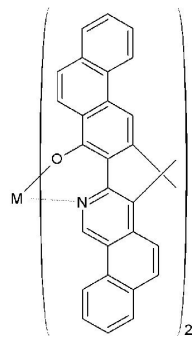
[화학식 2-93]



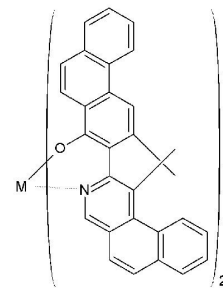
[화학식 2-94]



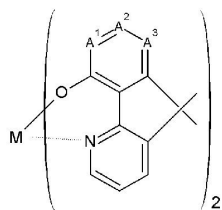
[화학식 2-95]



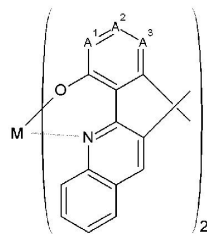
[화학식 2-96]



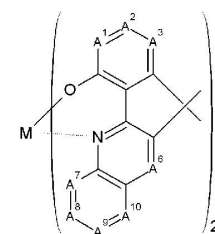
[화학식 2-97]



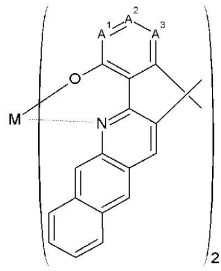
[화학식 2-98]



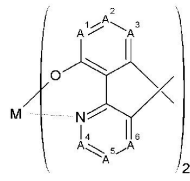
[화학식 2-99]



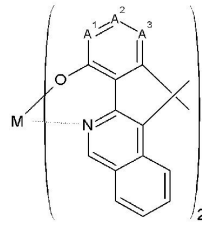
[화학식 2-100]



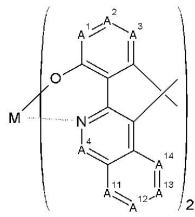
[화학식 2-101]



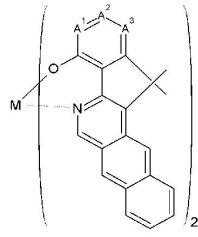
[화학식 2-102]



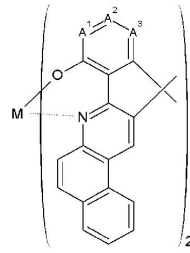
[화학식 2-103]



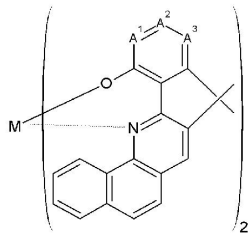
[화학식 2-104]



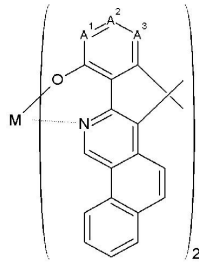
[화학식 2-105]



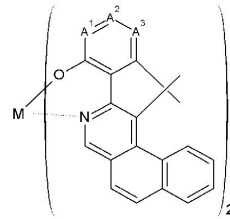
[화학식 2-106]



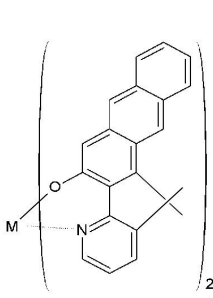
[화학식 2-107]



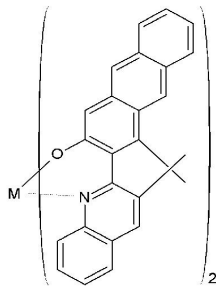
[화학식 2-108]



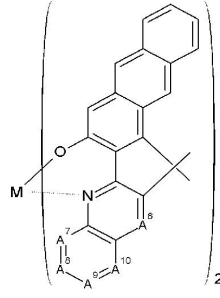
[화학식 2-109]



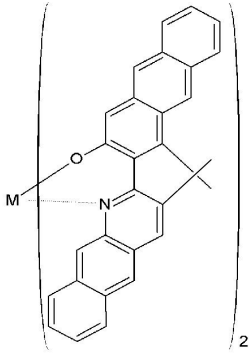
[화학식 2-110]



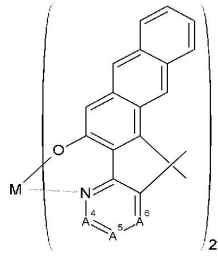
[화학식 2-111]



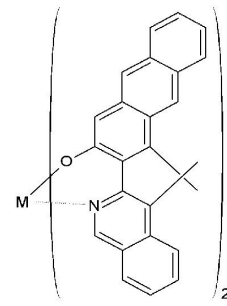
[화학식 2-112]



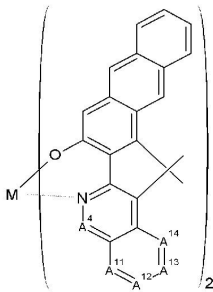
[화학식 2-113]



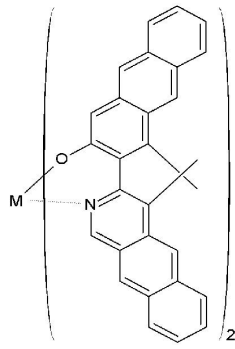
[화학식 2-114]



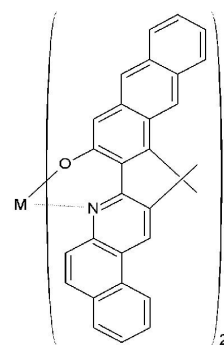
[화학식 2-115]



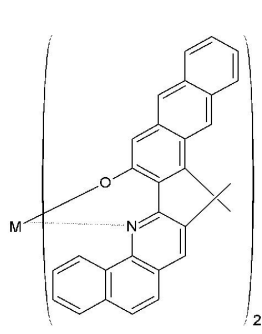
[화학식 2-116]



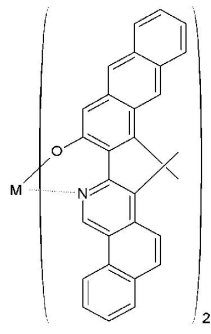
[화학식 2-117]



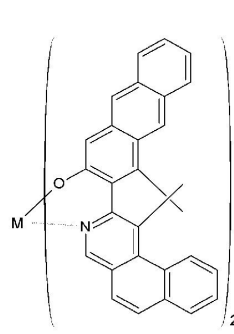
[화학식 2-118]



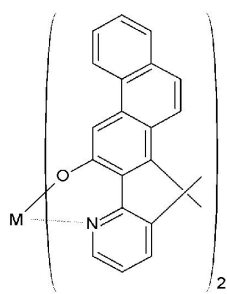
[화학식 2-119]



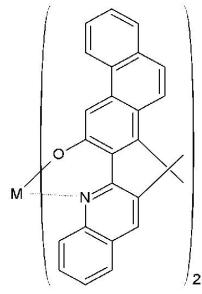
[화학식 2-120]



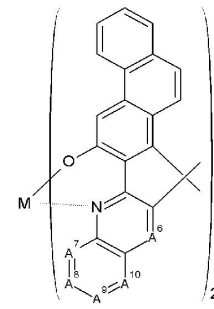
[화학식 2-121]



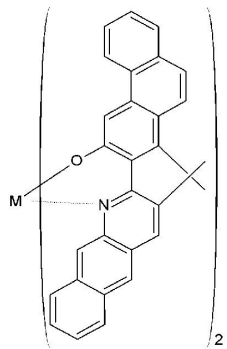
[화학식 2-122]



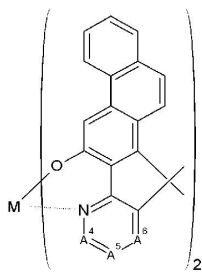
[화학식 2-123]



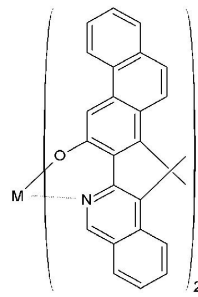
[화학식 2-124]



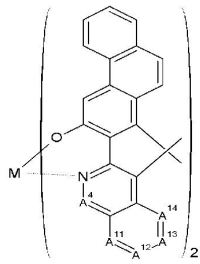
[화학식 2-125]



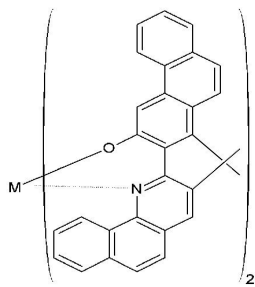
[화학식 2-126]



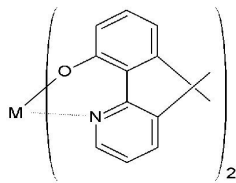
[화학식 2-127]



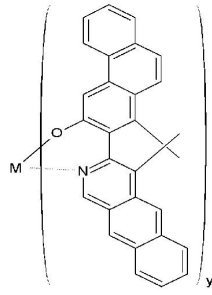
[화학식 2-130]



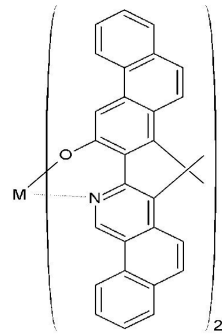
[화학식 2-133]



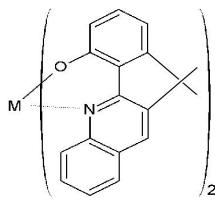
[화학식 2-128]



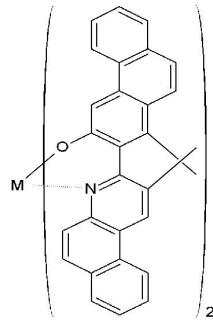
[화학식 2-131]



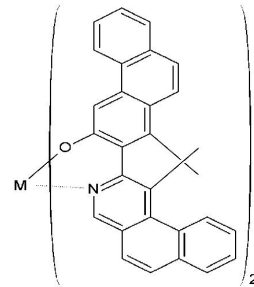
[화학식 2-134]



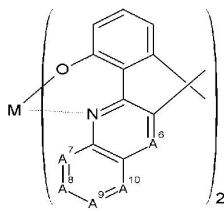
[화학식 2-129]



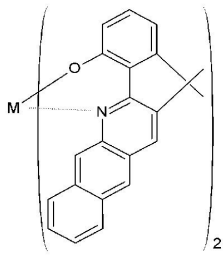
[화학식 2-132]



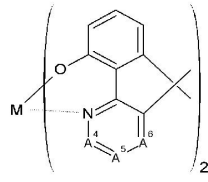
[화학식 2-135]



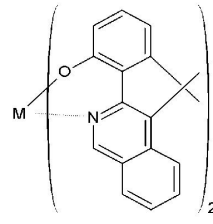
[화학식 2-136]



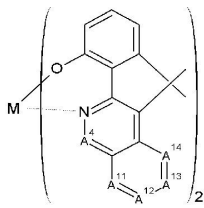
[화학식 2-137]



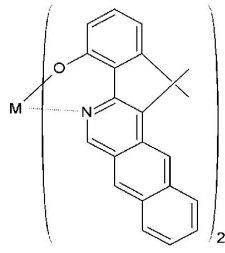
[화학식 2-138]



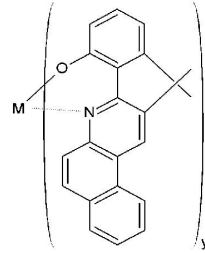
[화학식 2-139]



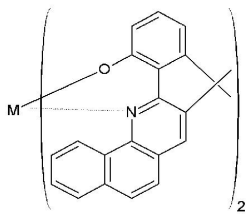
[화학식 2-140]



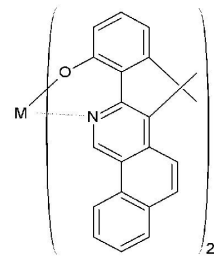
[화학식 2-141]



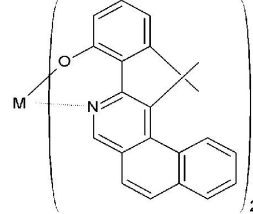
[화학식 2-142]



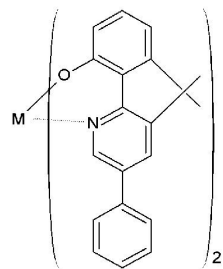
[화학식 2-143]



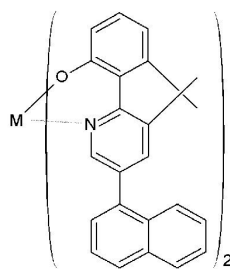
[화학식 2-144]



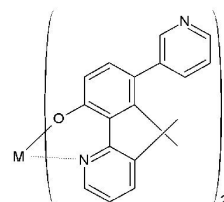
[화학식 2-145]



[화학식 2-146]



[화학식 2-147]



(상기 화학식 2-1 내지 2-147에서,

A^1 내지 A^{18} 은 서로 동일하거나 상이하며, 탄소 원자 또는 질소 원자이며, A^1 내지 A^{18} 중 적어도 하나는 질소 원자이고,

M은 Be 또는 Zn 이다.)

청구항 5

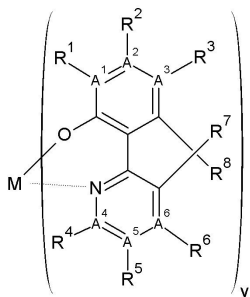
제1 전극;

상기 제1 전극과 마주하는 제2 전극; 및

상기 제1 전극과 상기 제2 전극 사이에 위치하는 유기층을 포함하고,

상기 유기층은 하기 화학식 1로 표시되는 금속 착체 화합물을 포함하는 유기 발광 장치.

[화학식 1]



(상기 화학식 1에서,

M은 2족 또는 3족의 금속 이온이며,

R^1 내지 R^8 은 서로 동일하거나 상이하며, 수소 원자, 할로젠 원자, 히드록시기, 치환 또는 비치환된 C1 내지 C20 알킬기이고, 치환 또는 비치환된 C2 내지 C20 알케닐기, 치환 또는 비치환된 C2 내지 C20 알키닐기, 치환 또는 비치환된 C1 내지 C20 알콕시기, 치환 또는 비치환된 C3 내지 C30 사이클로알킬기, 치환 또는 비치환된 C3 내지 C30 사이클로알케닐기, 치환 또는 비치환된 C3 내지 C30 사이클로알키닐기, 치환 또는 비치환된 C2 내지 C30 헤테로사이클로알킬기, 치환 또는 비치환된 C2 내지 C30 헤테로사이클로알케닐기, 치환 또는 비치환된 C2 내지 C30 헤테로사이클로알키닐기, 치환 또는 비치환된 C6 내지 C30 아릴기, 치환 또는 비치환된 C6 내지 C30 아릴옥시기, 치환 또는 비치환된 C3 내지 C30 헤테로아릴기, 아민기, 에스테르기, 카르복실기, 니트로기 또는 시아노기일 수 있고,

R^1 및 R^2 , R^2 및 R^3 , R^4 및 R^5 , 그리고 R^5 및 R^6 은 각각 서로 결합하여 치환 또는 비치환된 C6 내지 C30 아릴기, 치환 또는 비치환된 C6 내지 C30 아릴옥시기, 치환 또는 비치환된 C3 내지 C30 헤테로아릴기를 형성할 수도 있으며,

A^1 내지 A^6 은 서로 동일하거나 상이하며, 탄소 원자 또는 질소 원자이며,

y는 2 또는 3이다.)

청구항 6

제5항에 있어서,

상기 유기층은 상기 제1 전극 위에 차례로 위치하는 정공 주입층, 정공 수송층, 발광층, 전자 수송층 및 전자 주입층 중 적어도 하나의 층을 포함하는 것인 유기 발광 장치.

청구항 7

제6항에 있어서,

상기 금속 착체 화합물은 상기 발광층에 포함되는 것인 유기 발광 장치.

청구항 8

제6항에 있어서,

상기 금속 착체 화합물은 상기 전자 수송층에 포함되는 것인 유기 발광 장치.

청구항 9

제5항에 있어서,

상기 화학식 1에서의 R^1 내지 R^8 은 서로 동일하거나 상이하며, 수소 원자, 할로겐 원자, 치환 또는 비치환된 C1 내지 C20 알킬기이고, 치환 또는 비치환된 C6 내지 C30 아릴기, 치환 또는 비치환된 C6 내지 C30 아릴옥시기, 치환 또는 비치환된 C3 내지 C30 헤테로아릴기, 아민기, 에스테르기, 니트로기 또는 시아노기일 수 있고,

R^1 및 R^2 , R^2 및 R^3 , R^4 및 R^5 , 그리고 R^5 및 R^6 은 각각 서로 결합하여 치환 또는 비치환된 C6 내지 C30 아릴기, 치환 또는 비치환된 C6 내지 C30 아릴옥시기, 치환 또는 비치환된 C3 내지 C30 헤테로아릴기를 형성할 수 있는 것인 유기 발광 장치.

청구항 10

제5항에 있어서,

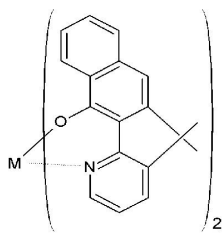
상기 화학식 1에서의 M은 Be, Zn, Mg, Ca, Y, B, Al, Ga, In 또는 이들의 조합인 것인 유기 발광 장치.

청구항 11

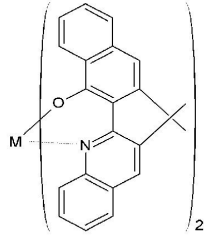
제5항에 있어서,

상기 금속 착체 화합물은 하기 화학식 2-1 내지 2-147 중 어느 하나로 표시되는 것인 유기 발광 장치.

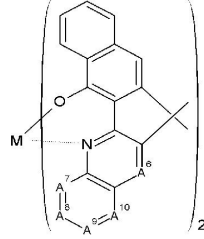
[화학식 2-1]



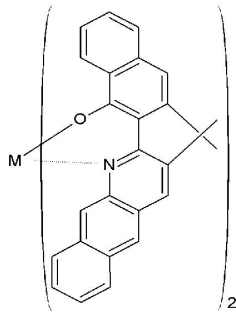
[화학식 2-2]



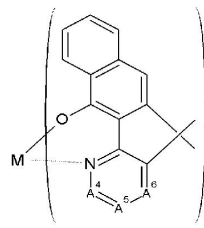
[화학식 2-3]



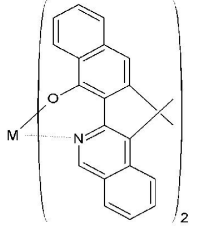
[화학식 2-4]



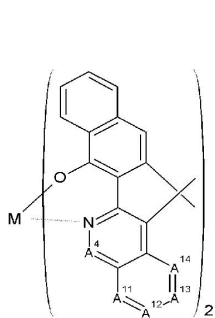
[화학식 2-5]



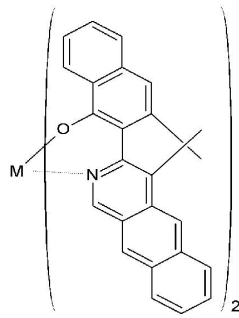
[화학식 2-6]



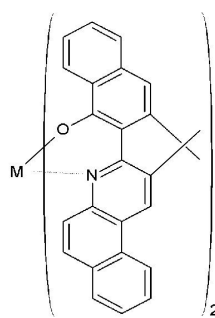
[화학식 2-7]



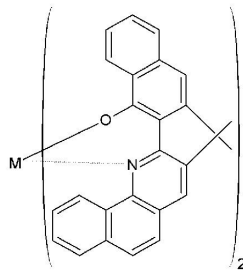
[화학식 2-8]



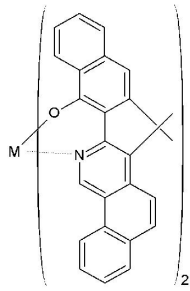
[화학식 2-9]



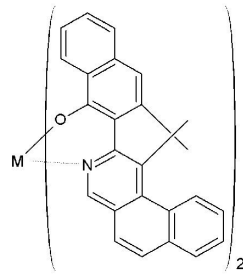
[화학식 2-10]



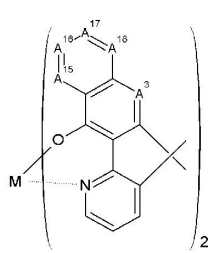
[화학식 2-11]



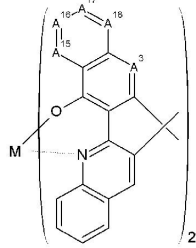
[화학식 2-12]



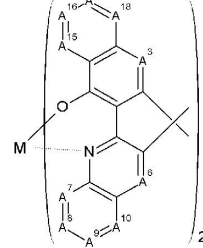
[화학식 2-13]



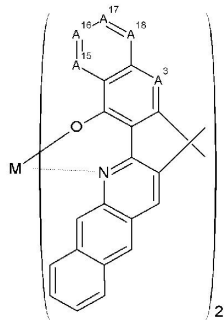
[화학식 2-14]



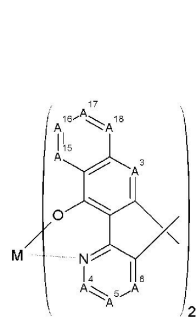
[화학식 2-15]



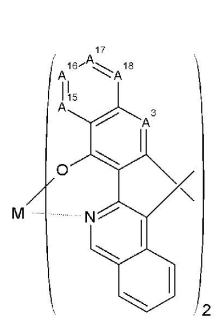
[화학식 2-16]



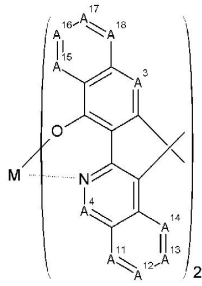
[화학식 2-17]



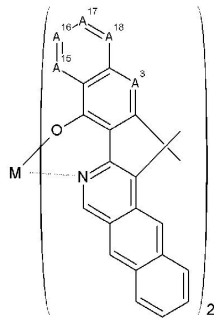
[화학식 2-18]



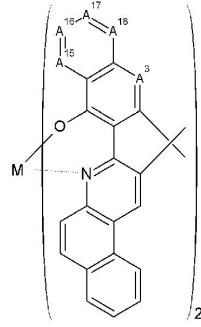
[화학식 2-19]



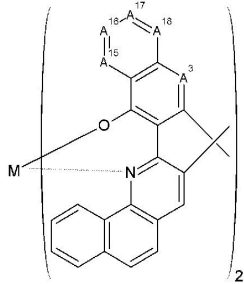
[화학식 2-20]



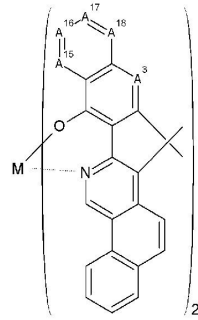
[화학식 2-21]



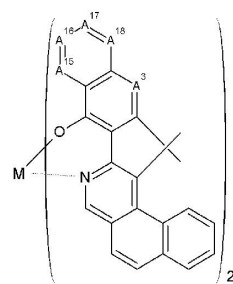
[화학식 2-22]



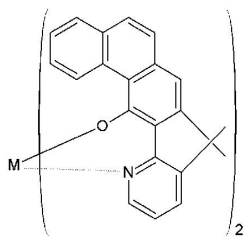
[화학식 2-23]



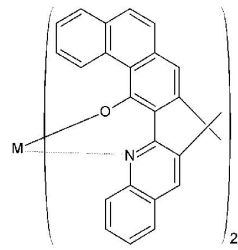
[화학식 2-24]



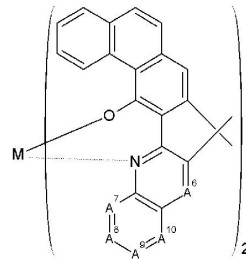
[화학식 2-25]



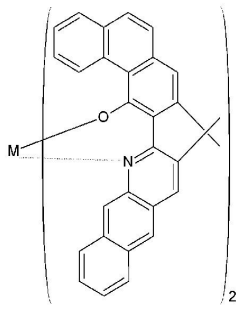
[화학식 2-26]



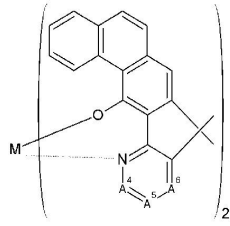
[화학식 2-27]



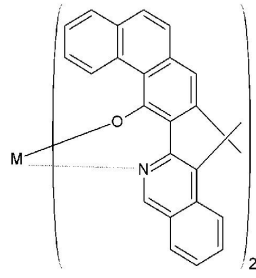
[화학식 2-28]



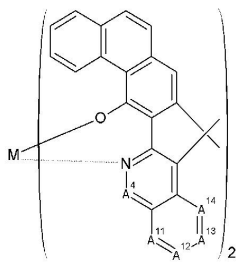
[화학식 2-29]



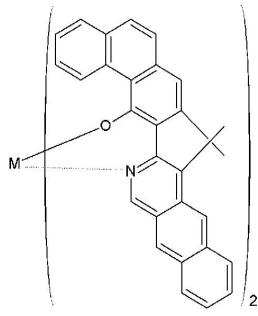
[화학식 2-30]



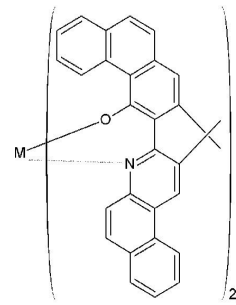
[화학식 2-31]



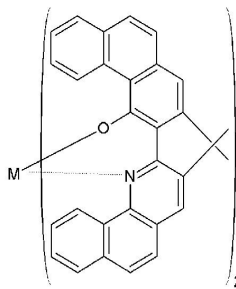
[화학식 2-32]



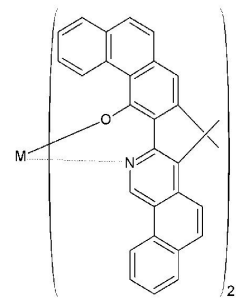
[화학식 2-33]



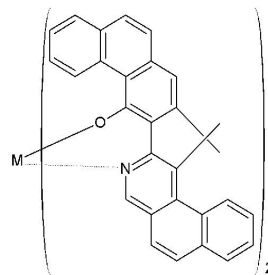
[화학식 2-34]



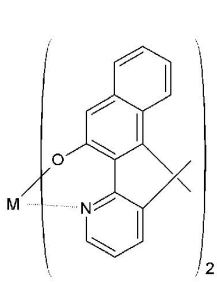
[화학식 2-35]



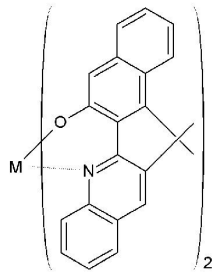
[화학식 2-36]



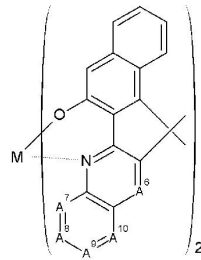
[화학식 2-37]



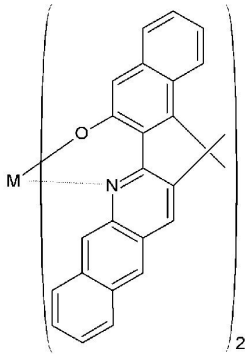
[화학식 2-38]



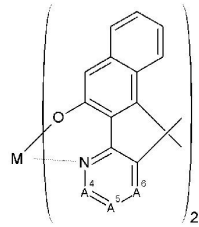
[화학식 2-39]



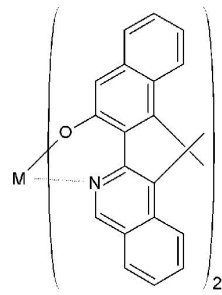
[화학식 2-40]



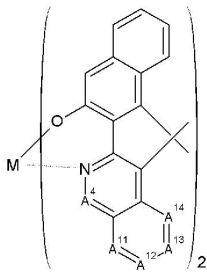
[화학식 2-41]



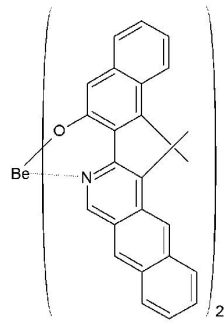
[화학식 2-42]



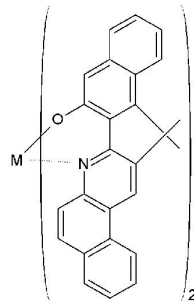
[화학식 2-43]



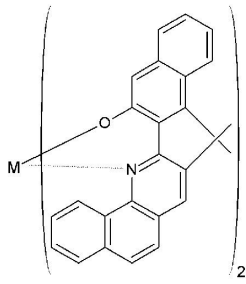
[화학식 2-44]



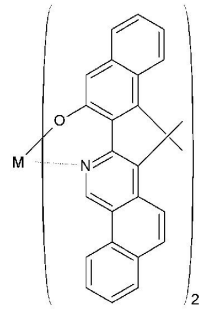
[화학식 2-45]



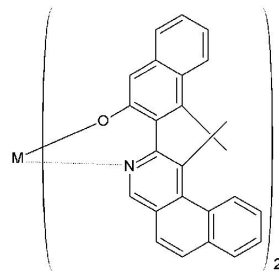
[화학식 2-46]



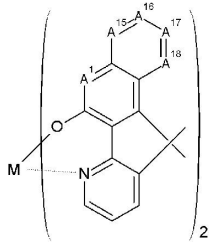
[화학식 2-47]



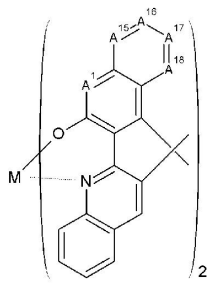
[화학식 2-48]



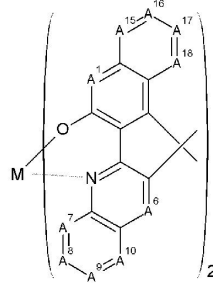
[화학식 2-49]



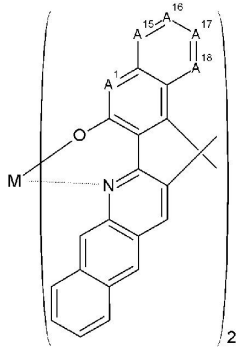
[화학식 2-50]



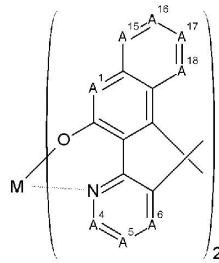
[화학식 2-51]



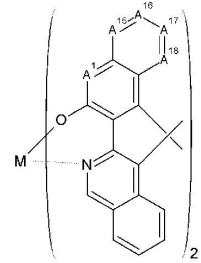
[화학식 2-52]



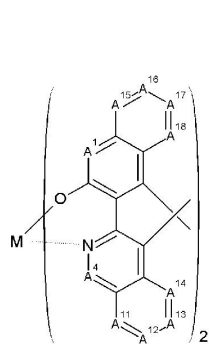
[화학식 2-53]



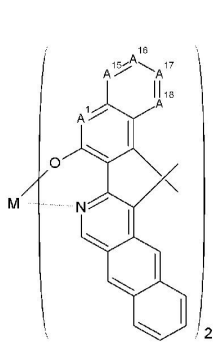
[화학식 2-54]



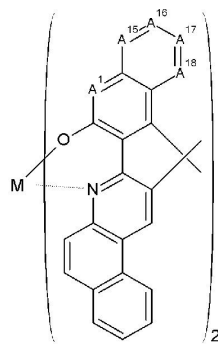
[화학식 2-55]



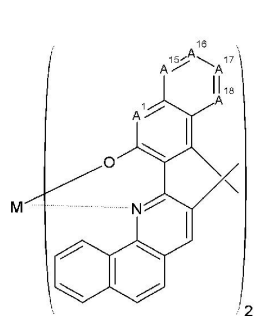
[화학식 2-56]



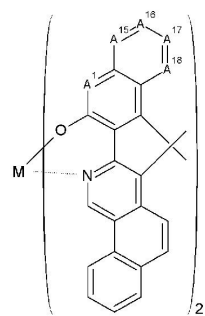
[화학식 2-57]



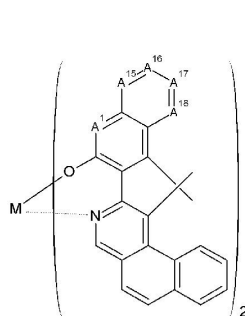
[화학식 2-58]



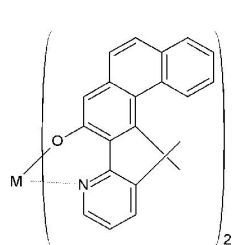
[화학식 2-59]



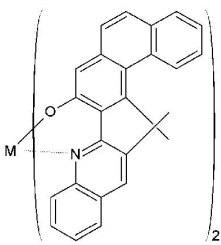
[화학식 2-60]



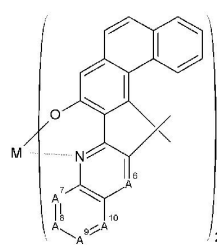
[화학식 2-61]



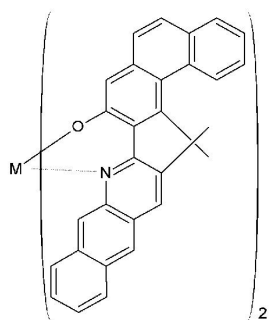
[화학식 2-62]



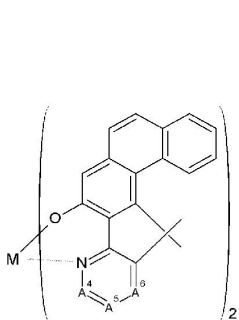
[화학식 2-63]



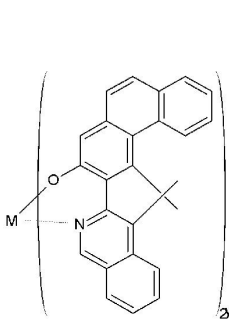
[화학식 2-64]



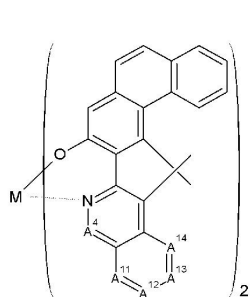
[화학식 2-65]



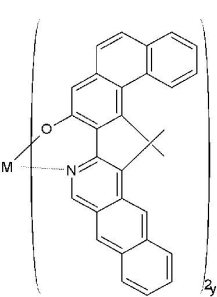
[화학식 2-66]



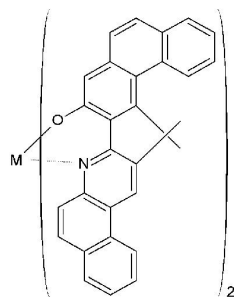
[화학식 2-67]



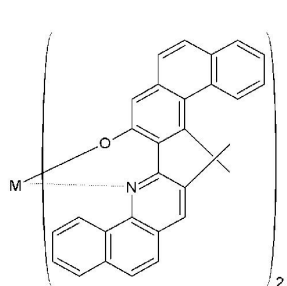
[화학식 2-68]



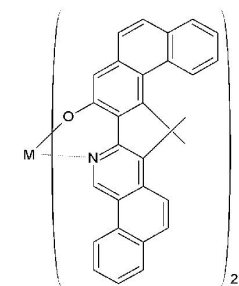
[화학식 2-69]



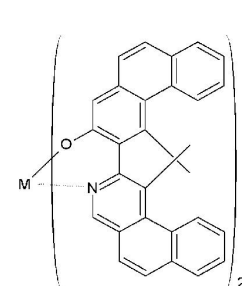
[화학식 2-70]



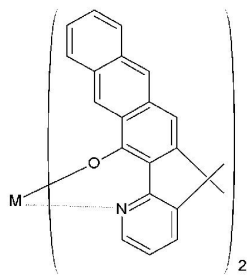
[화학식 2-71]



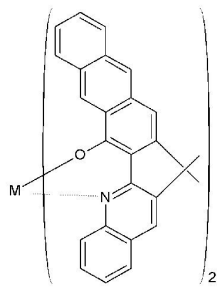
[화학식 2-72]



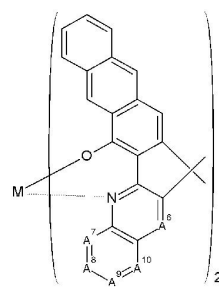
[화학식 2-73]



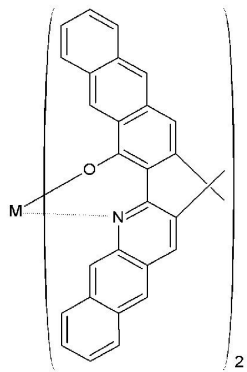
[화학식 2-74]



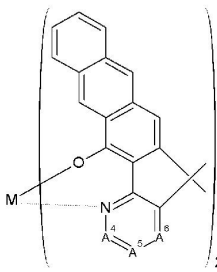
[화학식 2-75]



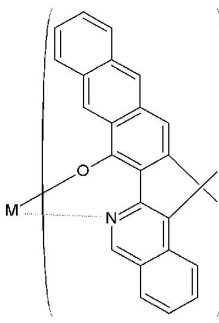
[화학식 2-76]



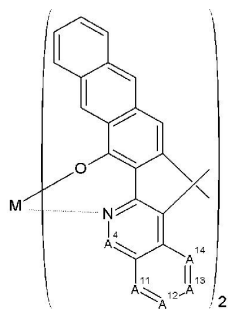
[화학식 2-77]



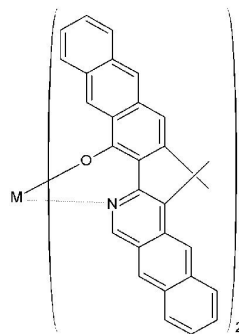
[화학식 2-78]



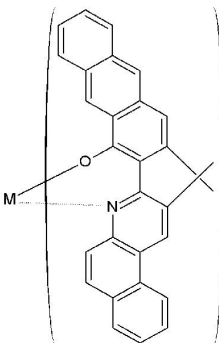
[화학식 2-79]



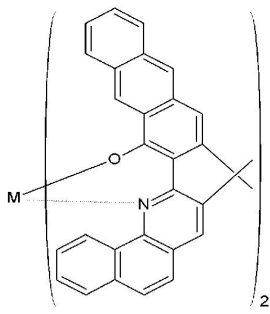
[화학식 2-80]



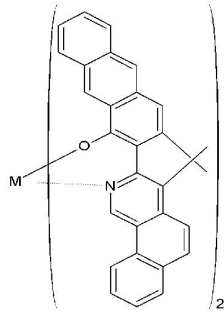
[화학식 2-81]



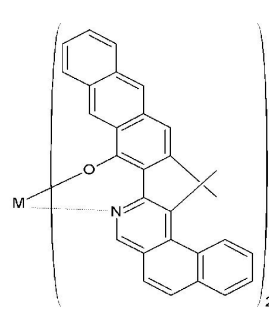
[화학식 2-82]



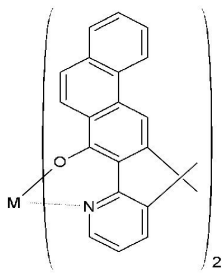
[화학식 2-83]



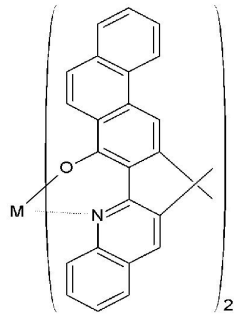
[화학식 2-84]



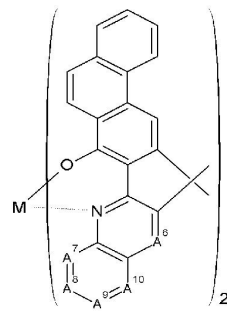
[화학식 2-85]



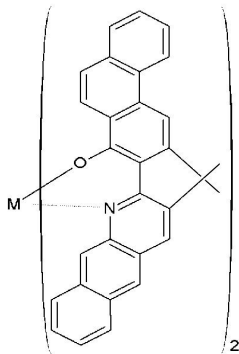
[화학식 2-86]



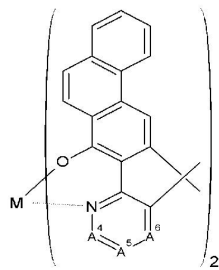
[화학식 2-87]



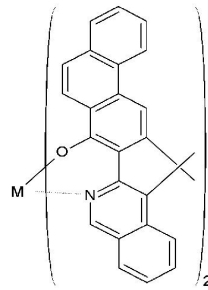
[화학식 2-88]



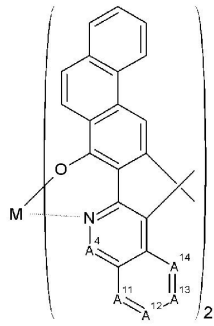
[화학식 2-89]



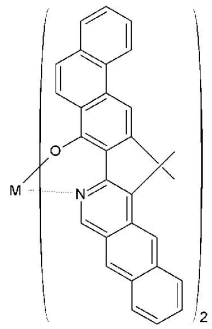
[화학식 2-90]



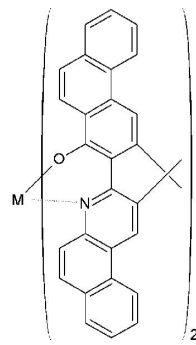
[화학식 2-91]



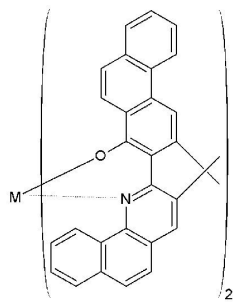
[화학식 2-92]



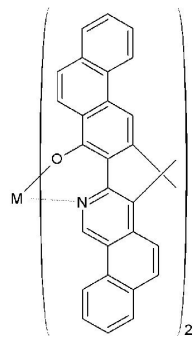
[화학식 2-93]



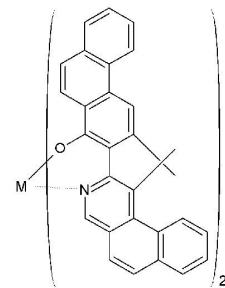
[화학식 2-94]



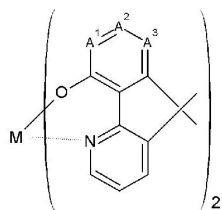
[화학식 2-95]



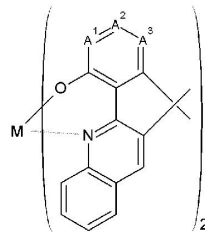
[화학식 2-96]



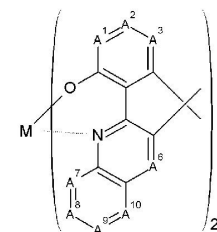
[화학식 2-97]



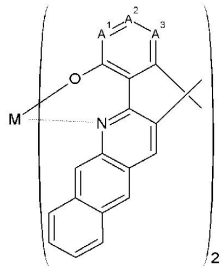
[화학식 2-98]



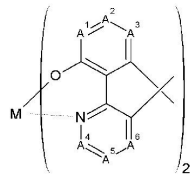
[화학식 2-99]



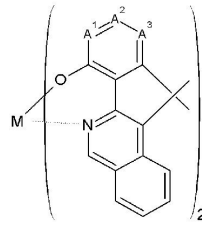
[화학식 2-100]



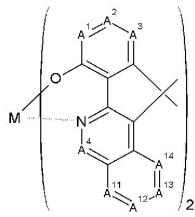
[화학식 2-101]



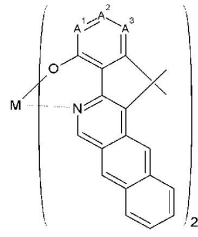
[화학식 2-102]



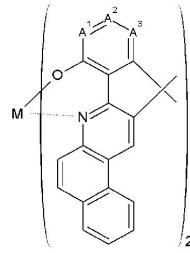
[화학식 2-103]



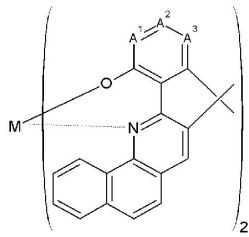
[화학식 2-104]



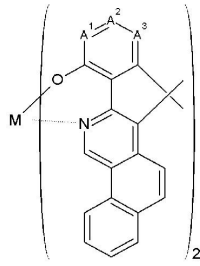
[화학식 2-105]



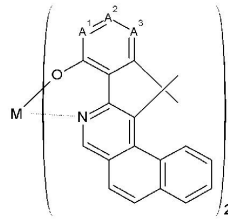
[화학식 2-106]



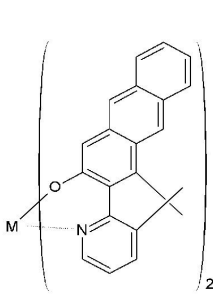
[화학식 2-107]



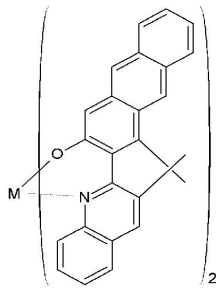
[화학식 2-108]



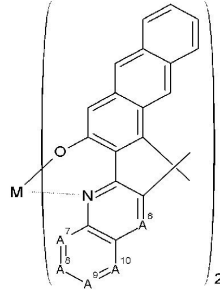
[화학식 2-109]



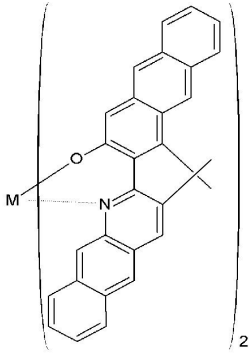
[화학식 2-110]



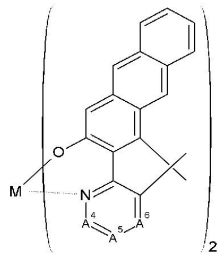
[화학식 2-111]



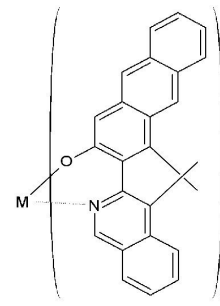
[화학식 2-112]



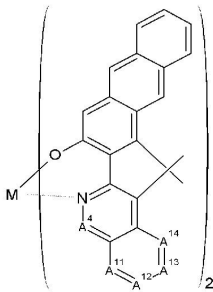
[화학식 2-113]



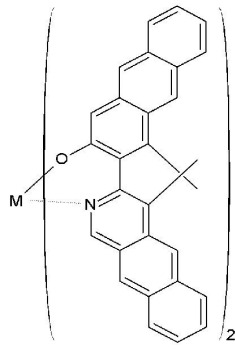
[화학식 2-114]



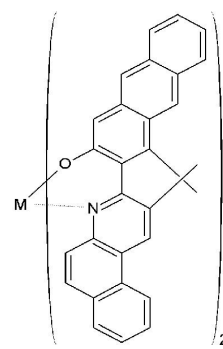
[화학식 2-115]



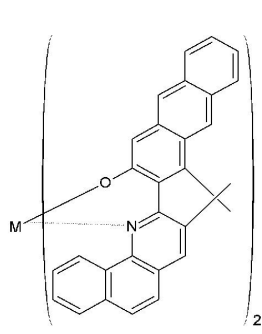
[화학식 2-116]



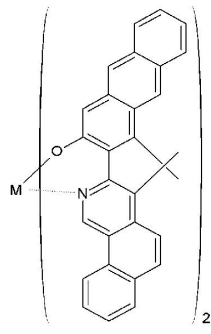
[화학식 2-117]



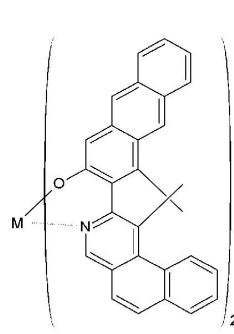
[화학식 2-118]



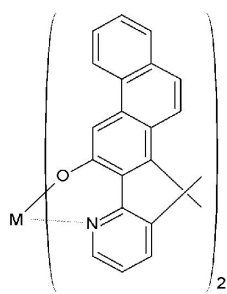
[화학식 2-119]



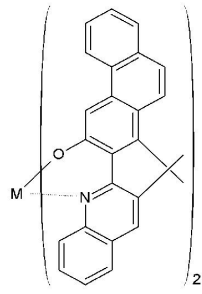
[화학식 2-120]



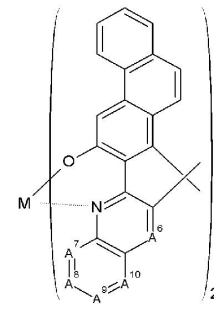
[화학식 2-121]



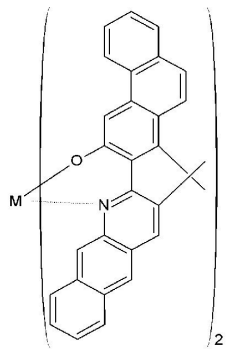
[화학식 2-122]



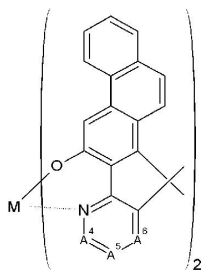
[화학식 2-123]



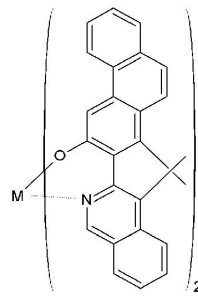
[화학식 2-124]



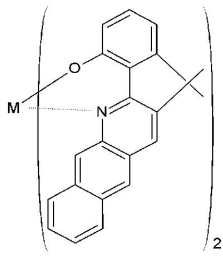
[화학식 2-125]



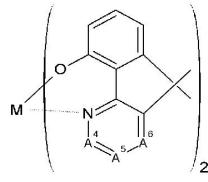
[화학식 2-126]



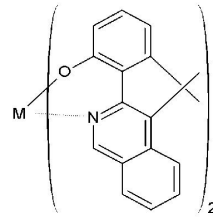
[화학식 2-136]



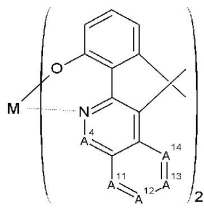
[화학식 2-137]



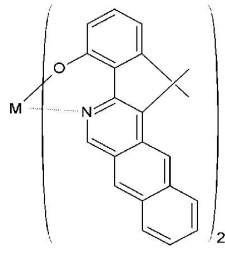
[화학식 2-138]



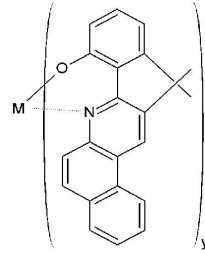
[화학식 2-139]



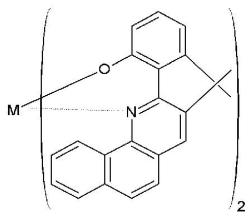
[화학식 2-140]



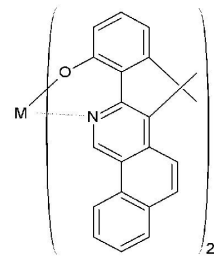
[화학식 2-141]



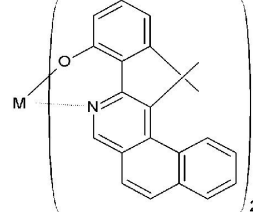
[화학식 2-142]



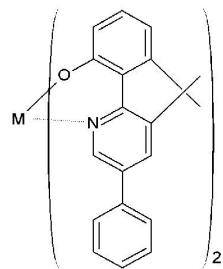
[화학식 2-143]



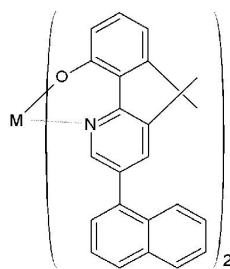
[화학식 2-144]



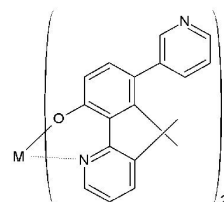
[화학식 2-145]



[화학식 2-146]



[화학식 2-147]



(상기 화학식 2-1 내지 2-147에서,

A^1 내지 A^{18} 은 서로 동일하거나 상이하며, 탄소 원자 또는 질소 원자이며, A^1 내지 A^{18} 중 적어도 하나는 질소 원자이고,

M은 Be 또는 Zn 이다.)

명세서

기술분야

[0001] 본 기재는 금속 착체 화합물 및 이를 포함하는 유기 발광 장치에 관한 것이다.

배경 기술

[0002] 최근 표시 장치 및 조명 장치로서, 유기 발광 장치(organic light emitting diode device, OLED device)가 주목 받고 있다.

[0003] 유기 발광 장치는 두 개의 전극과 그 사이에 위치하는 발광층을 포함하며, 하나의 전극으로부터 주입된 전자(electron)와 다른 전극으로부터 주입된 정공(hole)이 발광층에서 결합하여 여기자(exciton)를 형성하고, 여기자가 에너지를 방출하면서 발광한다.

[0004] 유기 발광 장치는 자체발광형으로 별도의 광원이 필요 없으므로 소비전력 측면에서 유리할 뿐만 아니라, 응답 속도, 시야각 및 대비비(contrast ratio)도 우수하다.

[0005] 이러한 유기 발광 장치는 발광 효율을 높이고 구동 전압을 낮추는 것이 중요하다.

발명의 내용

해결하려는 과제

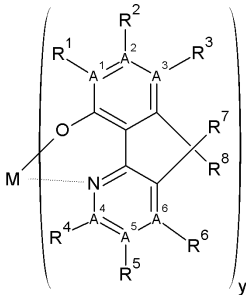
[0006] 본 발명의 일 측면은 발광 효율을 높이고 구동 전압을 낮출 수 있는 금속 착체 화합물을 제공하기 위한 것이다.

[0007] 본 발명의 다른 일 측면은 상기 금속 착체 화합물을 포함하는 유기 발광 장치를 제공하기 위한 것이다.

과제의 해결 수단

[0008] 본 발명의 일 측면은 하기 화학식 1로 표시되는 금속 착체 화합물을 제공한다.

[0009] [화학식 1]



[0010]

(상기 화학식 1에서,

[0012] M은 2족 또는 3족의 금속 이온이며,

[0013] R¹ 내지 R⁸은 서로 동일하거나 상이하며, 수소 원자, 할로젠 원자, 히드록시기, 치환 또는 비치환된 C1 내지 C20 알킬기이고, 치환 또는 비치환된 C2 내지 C20 알케닐기, 치환 또는 비치환된 C2 내지 C20 알키닐기, 치환 또는 비치환된 C1 내지 C20 알콕시기, 치환 또는 비치환된 C3 내지 C30 사이클로알킬기, 치환 또는 비치환된 C3 내지 C30 사이클로알케닐기, 치환 또는 비치환된 C3 내지 C30 사이클로알키닐기, 치환 또는 비치환된 C2 내지 C30 헤테로사이클로알킬기, 치환 또는 비치환된 C2 내지 C30 헤테로사이클로알케닐기, 치환 또는 비치환된 C2 내지 C30 헤테로사이클로알키닐기, 치환 또는 비치환된 C6 내지 C30 아릴기, 치환 또는 비치환된 C6 내지 C30 아릴옥시기, 치환 또는 비치환된 C3 내지 C30 헤테로아릴기, 아민기, 에스테르기, 카르복실기, 니트로기 또는 시아노기일 수 있고,

[0014] R¹ 및 R², R² 및 R³, R⁴ 및 R⁵, 그리고 R⁵ 및 R⁶은 각각 서로 결합하여 치환 또는 비치환된 C6 내지 C30 아릴기, 치환 또는 비치환된 C6 내지 C30 아릴옥시기, 치환 또는 비치환된 C3 내지 C30 헤테로아릴기를 형성할 수도 있

으며,

[0015] A^1 내지 A^6 은 서로 동일하거나 상이하며, 탄소 원자 또는 질소 원자이며,

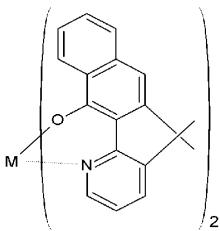
[0016] y 는 2 또는 3이다.)

[0017] 상기 화학식 1에서의 R^1 내지 R^8 은 서로 동일하거나 상이하며, 수소 원자, 할로겐 원자, 치환 또는 비치환된 C1 내지 C20 알킬기이고, 치환 또는 비치환된 C6 내지 C30 아릴기, 치환 또는 비치환된 C6 내지 C30 아릴옥시기, 치환 또는 비치환된 C3 내지 C30 헤테로아릴기, 아민기, 에스테르기, 니트로기 또는 시아노기일 수 있고, R^1 및 R^2 , R^2 및 R^3 , R^4 및 R^5 , 그리고 R^5 및 R^6 은 각각 서로 결합하여 치환 또는 비치환된 C6 내지 C30 아릴기, 치환 또는 비치환된 C6 내지 C30 아릴옥시기, 치환 또는 비치환된 C3 내지 C30 헤테로아릴기를 형성할 수 있는 것일 수 있다.

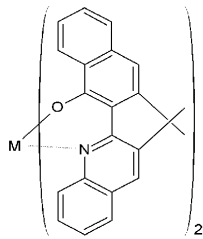
[0018] 상기 화학식 1에서의 M은 Be, Zn, Mg, Ca, Y, B, Al, Ga, In 또는 이들의 조합일 수 있다.

[0019] 상기 금속 착체 화합물은 하기 화학식 2-1 내지 2-147 중 어느 하나로 표시될 수 있다.

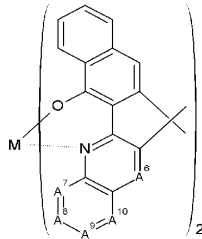
[화학식 2-1]



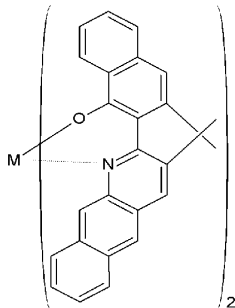
[화학식 2-2]



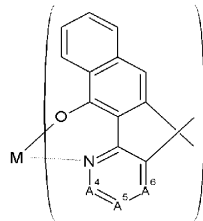
[화학식 2-3]



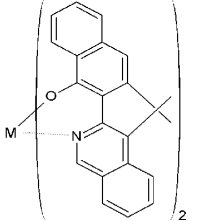
[화학식 2-4]



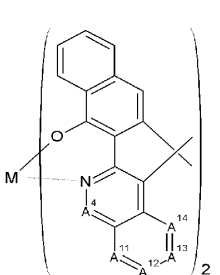
[화학식 2-5]



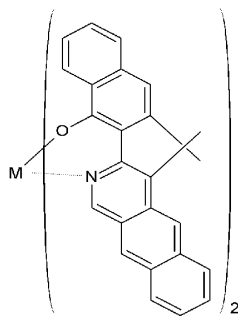
[화학식 2-6]



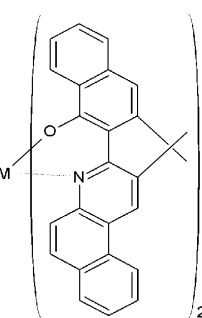
[화학식 2-7]



[화학식 2-8]

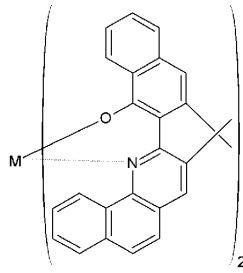


[화학식 2-9]

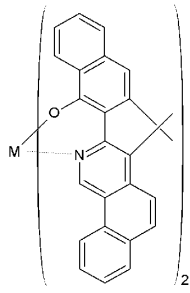


[0020]

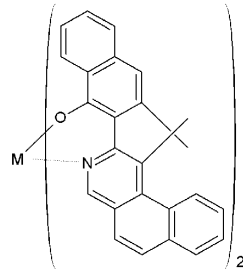
[화학식 2-10]



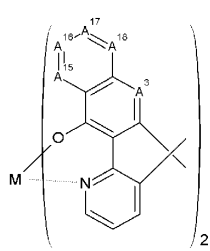
[화학식 2-11]



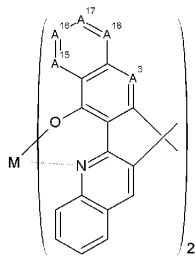
[화학식 2-12]



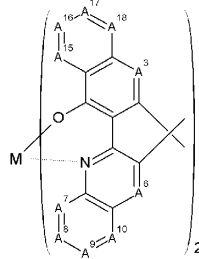
[화학식 2-13]



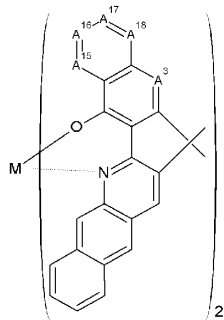
[화학식 2-14]



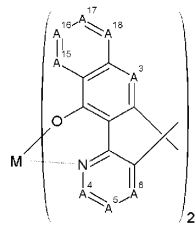
[화학식 2-15]



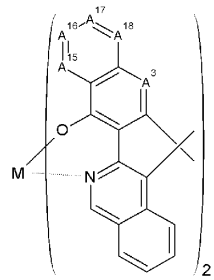
[화학식 2-16]



[화학식 2-17]

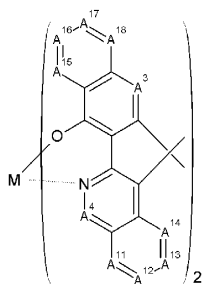


[화학식 2-18]

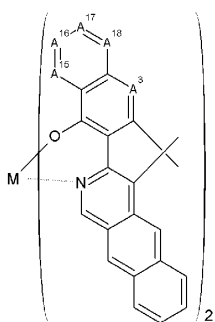


[0021]

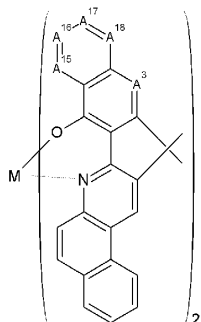
[화학식 2-19]



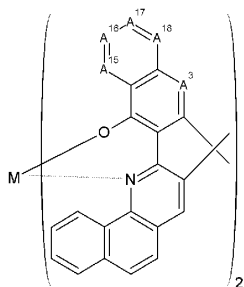
[화학식 2-20]



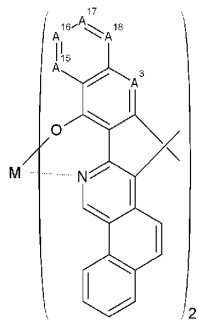
[화학식 2-21]



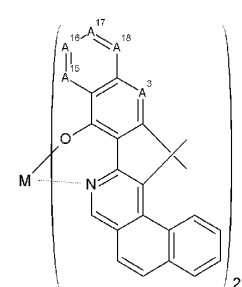
[화학식 2-22]



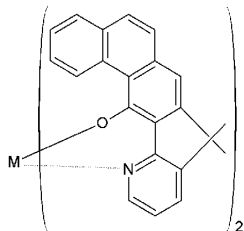
[화학식 2-23]



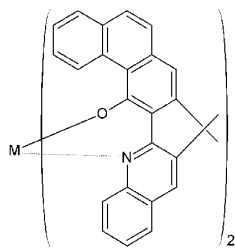
[화학식 2-24]



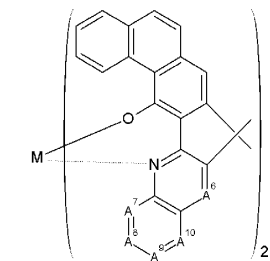
[화학식 2-25]



[화학식 2-26]

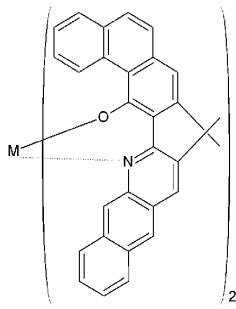


[화학식 2-27]

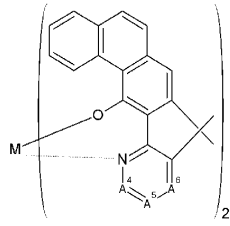


[0022]

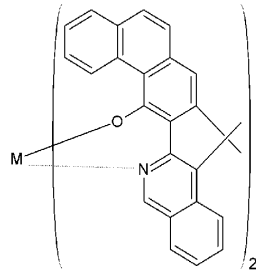
[화학식 2-28]



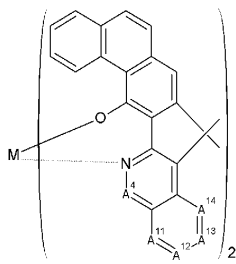
[화학식 2-29]



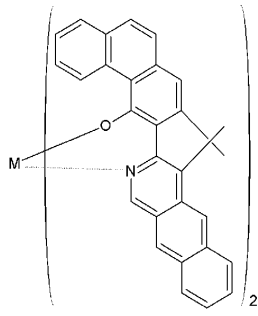
[화학식 2-30]



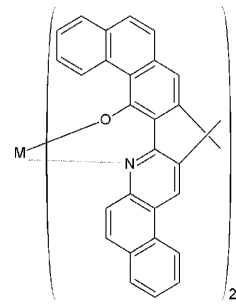
[화학식 2-31]



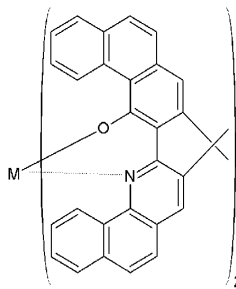
[화학식 2-32]



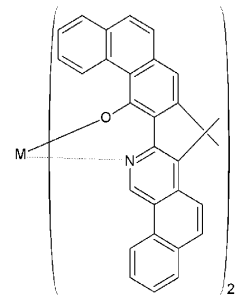
[화학식 2-33]



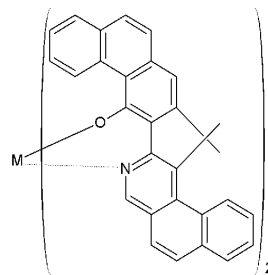
[화학식 2-34]



[화학식 2-35]

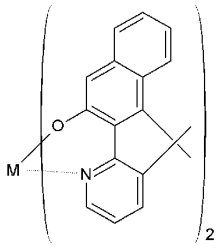


[화학식 2-36]

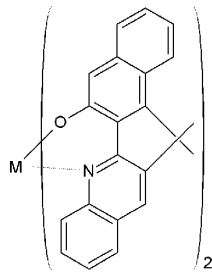


[0023]

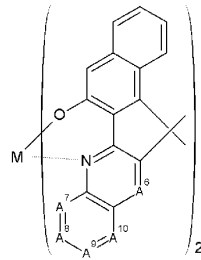
[화학식 2-37]



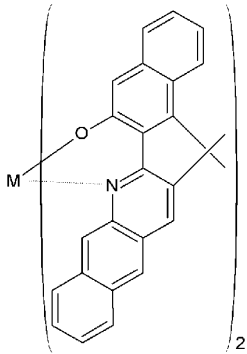
[화학식 2-38]



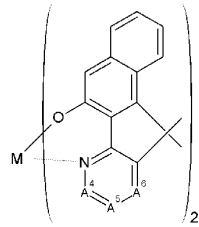
[화학식 2-39]



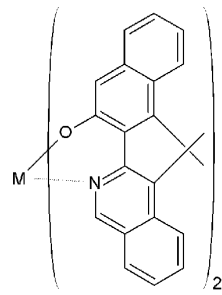
[화학식 2-40]



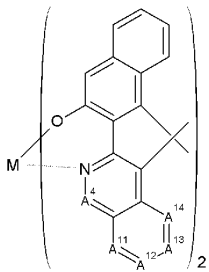
[화학식 2-41]



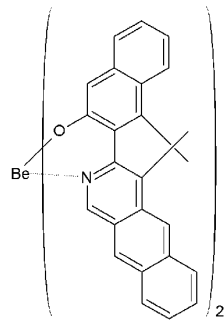
[화학식 2-42]



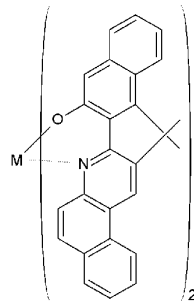
[화학식 2-43]



[화학식 2-44]

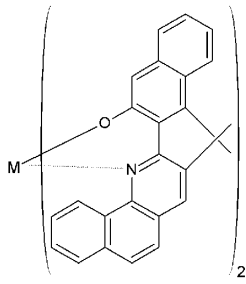


[화학식 2-45]

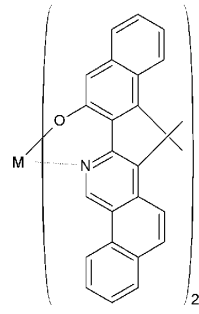


[0024]

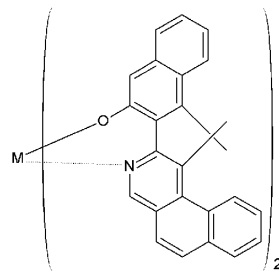
[화학식 2-46]



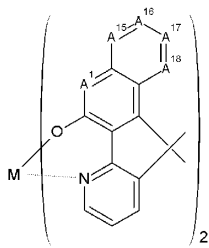
[화학식 2-47]



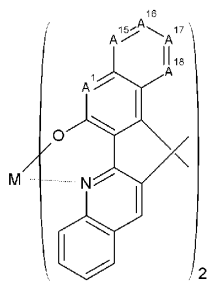
[화학식 2-48]



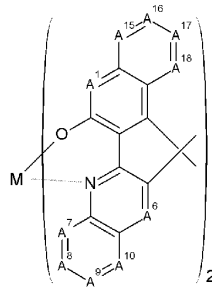
[화학식 2-49]



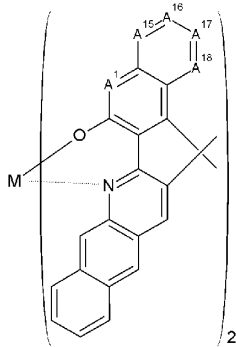
[화학식 2-50]



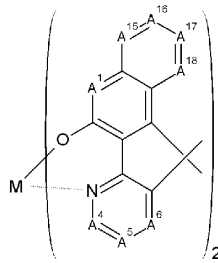
[화학식 2-51]



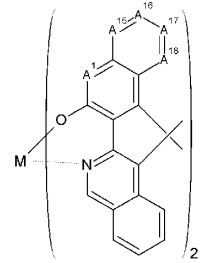
[화학식 2-52]



[화학식 2-53]

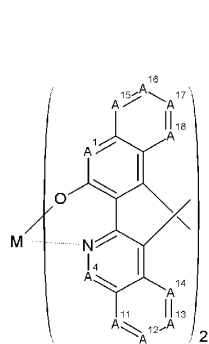


[화학식 2-54]

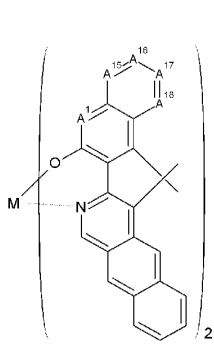


[0025]

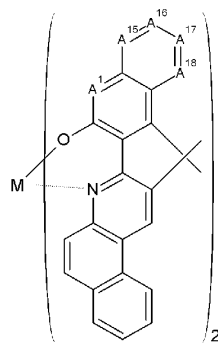
[화학식 2-55]



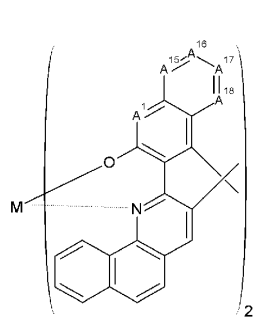
[화학식 2-56]



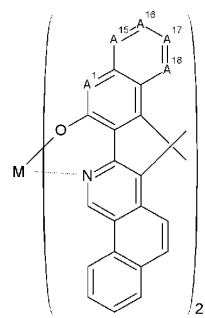
[화학식 2-57]



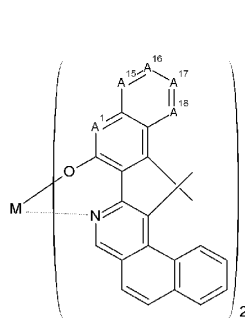
[화학식 2-58]



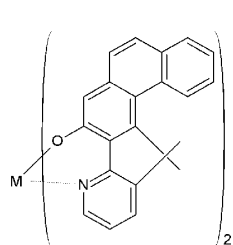
[화학식 2-59]



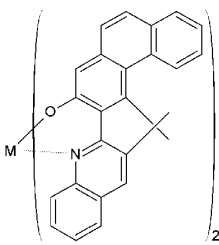
[화학식 2-60]



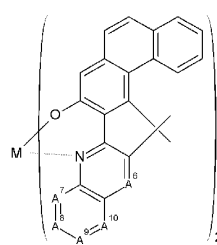
[화학식 2-61]



[화학식 2-62]

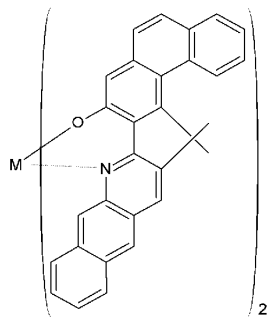


[화학식 2-63]

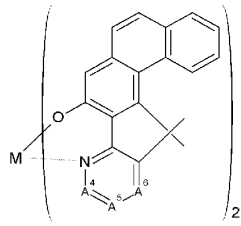


[0026]

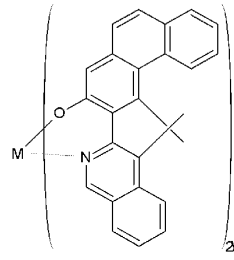
[화학식 2-64]



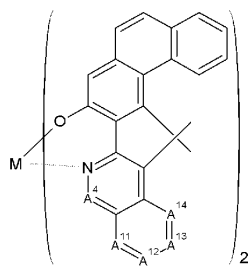
[화학식 2-65]



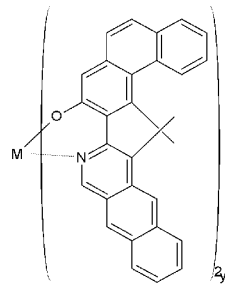
[화학식 2-66]



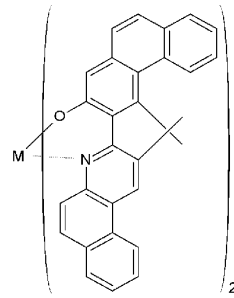
[화학식 2-67]



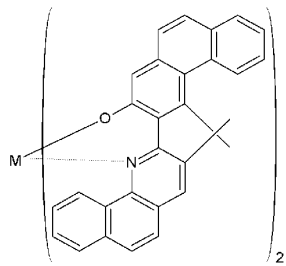
[화학식 2-68]



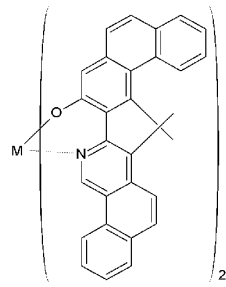
[화학식 2-69]



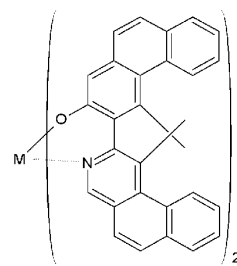
[화학식 2-70]



[화학식 2-71]

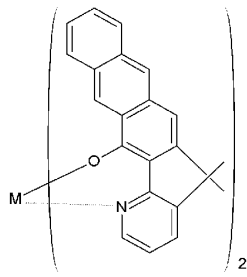


[화학식 2-72]

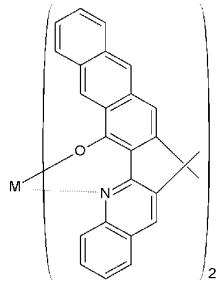


[0027]

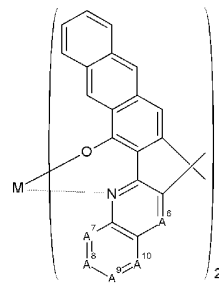
[화학식 2-73]



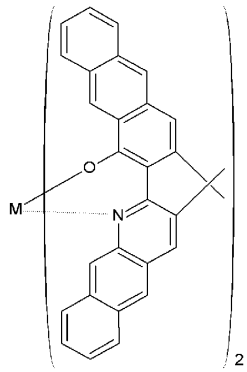
[화학식 2-74]



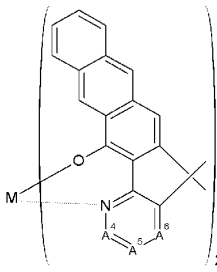
[화학식 2-75]



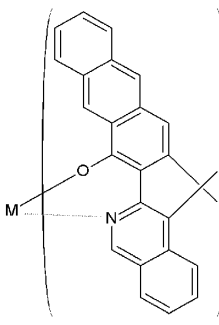
[화학식 2-76]



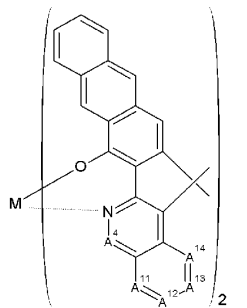
[화학식 2-77]



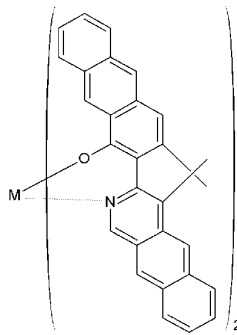
[화학식 2-78]



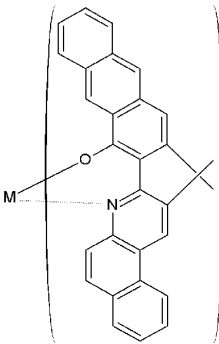
[화학식 2-79]



[화학식 2-80]

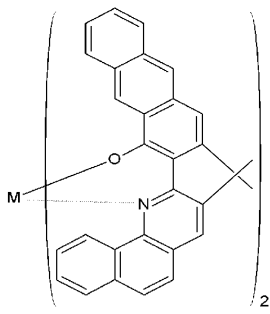


[화학식 2-81]

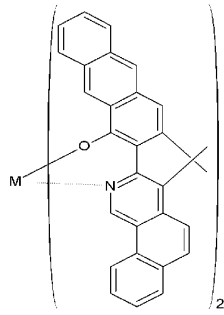


[0028]

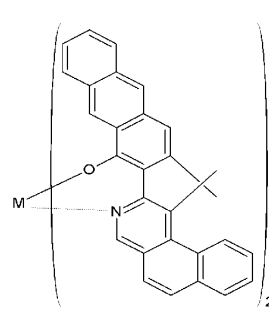
[화학식 2-82]



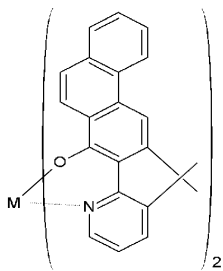
[화학식 2-83]



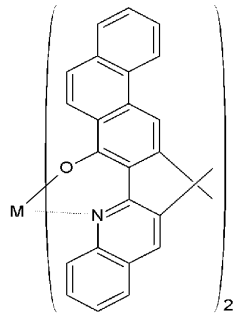
[화학식 2-84]



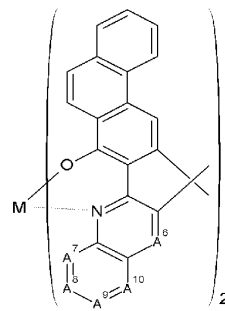
[화학식 2-85]



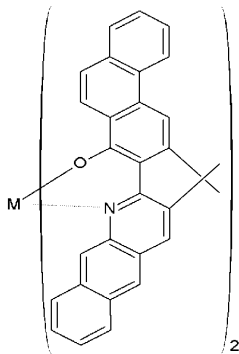
[화학식 2-86]



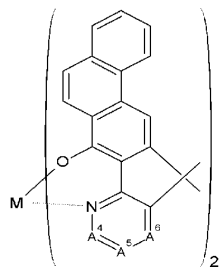
[화학식 2-87]



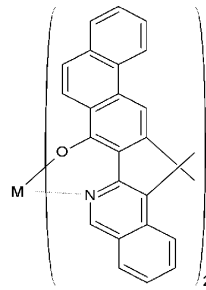
[화학식 2-88]



[화학식 2-89]

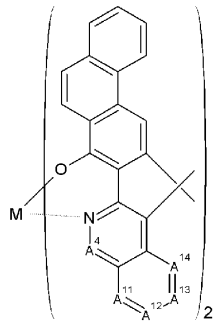


[화학식 2-90]

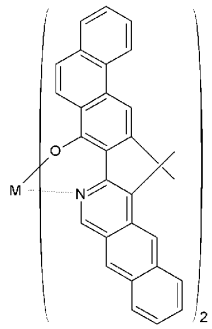


[0029]

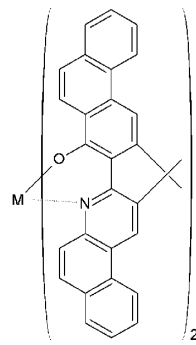
[화학식 2-91]



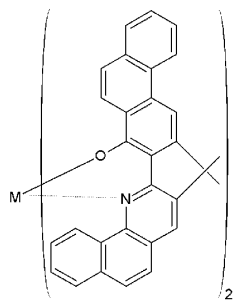
[화학식 2-92]



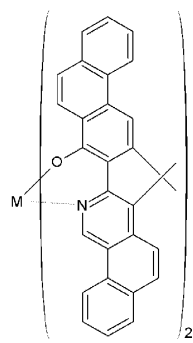
[화학식 2-93]



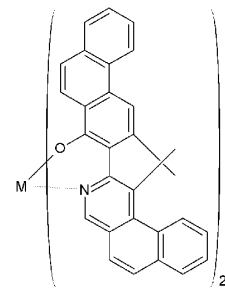
[화학식 2-94]



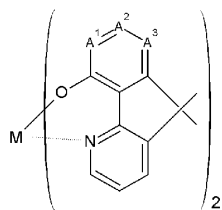
[화학식 2-95]



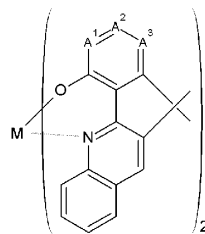
[화학식 2-96]



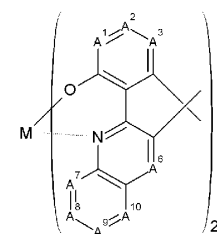
[화학식 2-97]



[화학식 2-98]

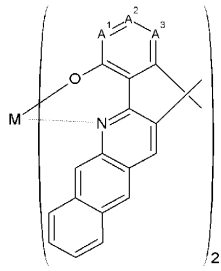


[화학식 2-99]

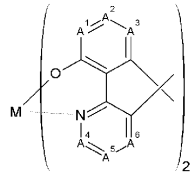


[0030]

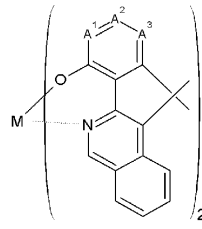
[화학식 2-100]



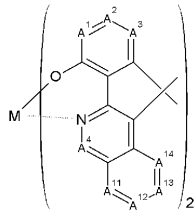
[화학식 2-101]



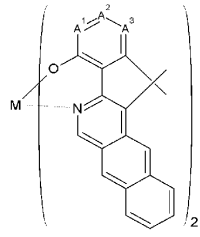
[화학식 2-102]



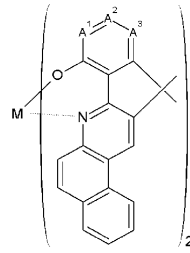
[화학식 2-103]



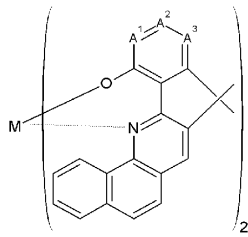
[화학식 2-104]



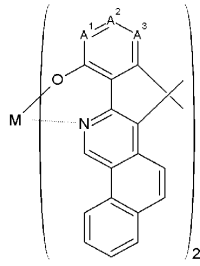
[화학식 2-105]



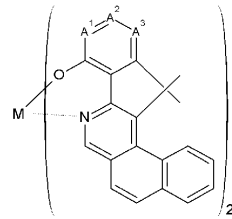
[화학식 2-106]



[화학식 2-107]

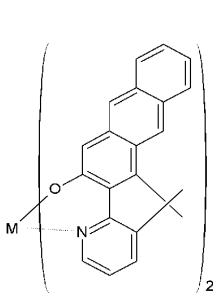


[화학식 2-108]

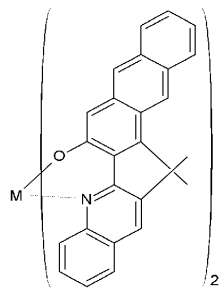


[0031]

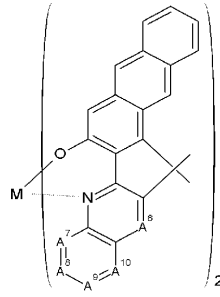
[화학식 2-109]



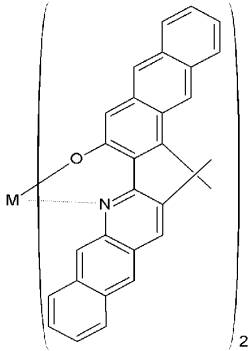
[화학식 2-110]



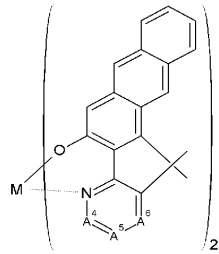
[화학식 2-111]



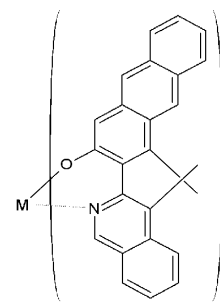
[화학식 2-112]



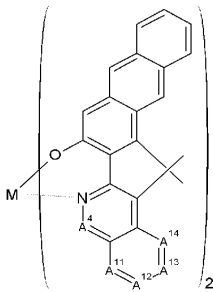
[화학식 2-113]



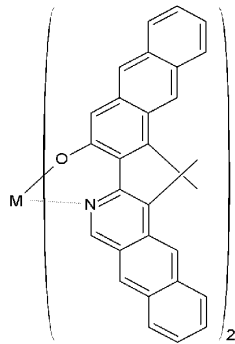
[화학식 2-114]



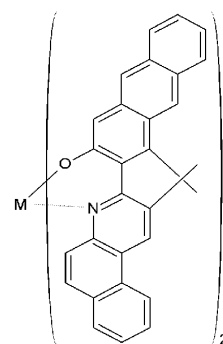
[화학식 2-115]



[화학식 2-116]

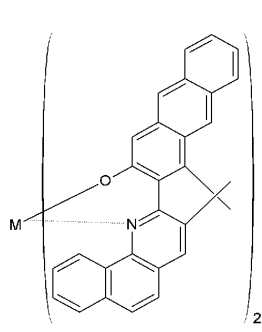


[화학식 2-117]

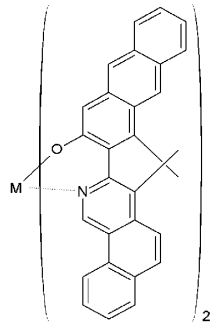


[0032]

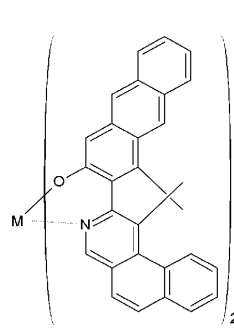
[화학식 2-118]



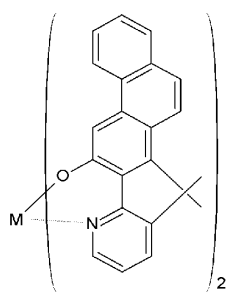
[화학식 2-119]



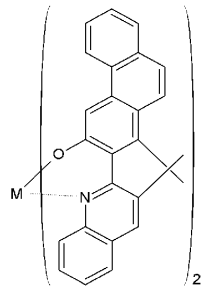
[화학식 2-120]



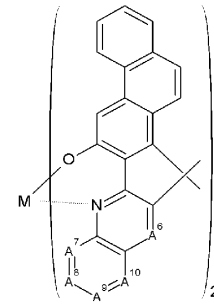
[화학식 2-121]



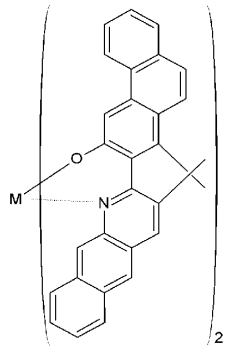
[화학식 2-122]



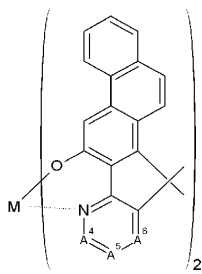
[화학식 2-123]



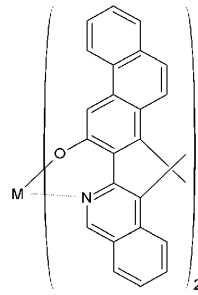
[화학식 2-124]



[화학식 2-125]

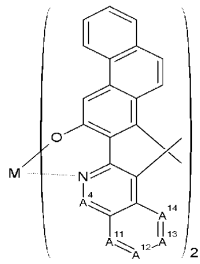


[화학식 2-126]

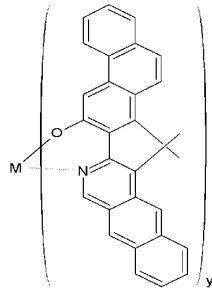


[0033]

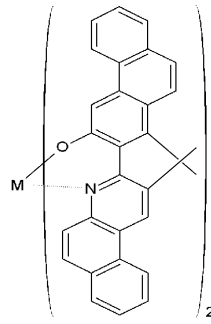
[화학식 2-127]



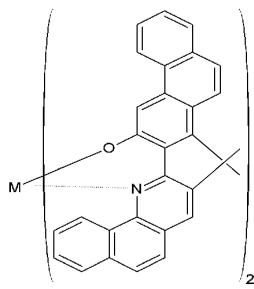
[화학식 2-128]



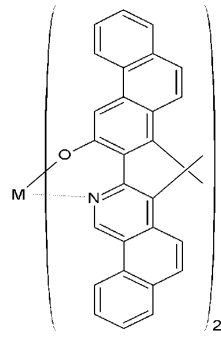
[화학식 2-129]



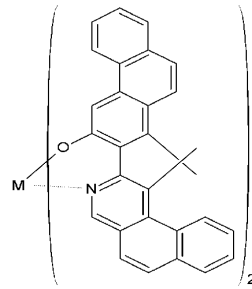
[화학식 2-130]



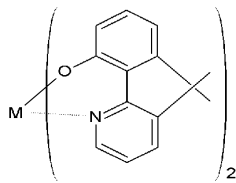
[화학식 2-131]



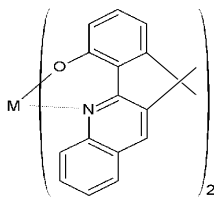
[화학식 2-132]



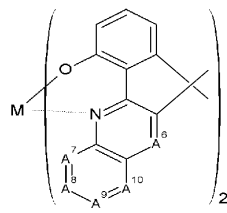
[화학식 2-133]



[화학식 2-134]

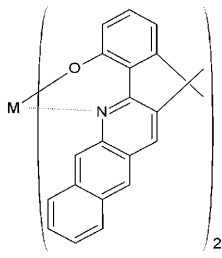


[화학식 2-135]

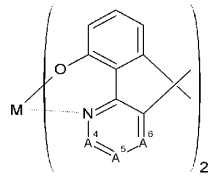


[0034]

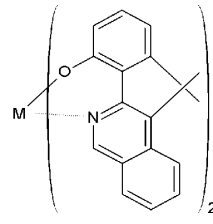
[화학식 2-136]



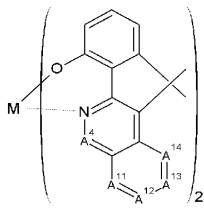
[화학식 2-137]



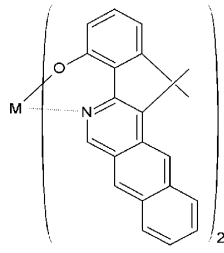
[화학식 2-138]



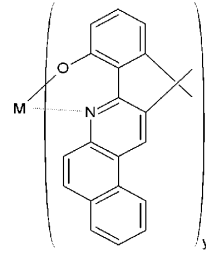
[화학식 2-139]



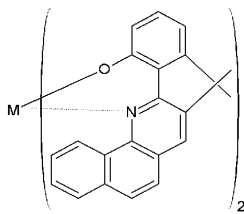
[화학식 2-140]



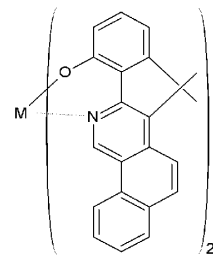
[화학식 2-141]



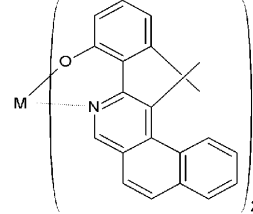
[화학식 2-142]



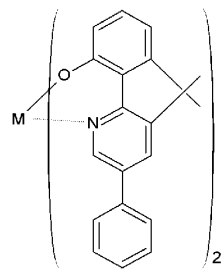
[화학식 2-143]



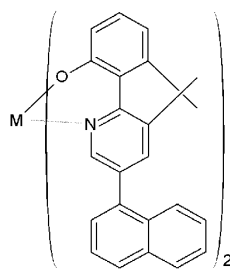
[화학식 2-144]



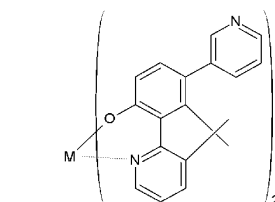
[화학식 2-145]



[화학식 2-146]



[화학식 2-147]



[0035]

[0036]

[0037]

[0038]

[0039]

[0040]

[0041]

(상기 화학식 2-1 내지 2-147에서,

A^1 내지 A^{18} 은 서로 동일하거나 상이하며, 탄소 원자 또는 질소 원자이며, A^1 내지 A^{18} 중 적어도 하나는 질소 원자이고,

M은 Be 또는 Zn 이다.)

본 발명의 다른 일 측면은 제1 전극; 상기 제1 전극과 마주하는 제2 전극; 및 상기 제1 전극과 상기 제2 전극 사이에 위치하는 유기층을 포함하고, 상기 유기층은 상기 화학식 1로 표시되는 금속 착체 화합물을 포함하는 유기 발광 장치를 제공한다.

상기 유기층은 상기 제1 전극 위에 차례로 위치하는 정공 주입층, 정공 수송층, 발광층, 전자 수송층 및 전자 주입층 중 적어도 하나의 층을 포함할 수 있고, 상기 금속 착체 화합물은 상기 발광층 또는 상기 전자 수송층에

포함될 수 있다.

[0042] 기타 본 발명의 측면들의 구체적인 사항은 이하의 상세한 설명에 포함되어 있다.

발명의 효과

[0043] 발광 효율을 높이고 구동 전압을 낮출 수 있다.

도면의 간단한 설명

[0044] 도 1은 일 구현예에 따른 유기 발광 장치를 개략적으로 도시한 단면도이다.

발명을 실시하기 위한 구체적인 내용

[0045] 이하, 첨부한 도면을 참조하여 본 발명의 구현예에 대하여 본 발명이 속하는 기술분야에서 통상의 지식을 가진 자가 용이하게 실시할 수 있도록 상세히 설명한다. 그러나 본 발명은 여러 가지 상이한 형태로 구현될 수 있으며 여기에서 설명하는 구현예에 한정되지 않는다.

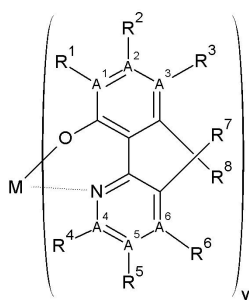
[0046] 도면에서 여러 층 및 영역을 명확하게 표현하기 위하여 두께를 확대하여 나타내었다. 명세서 전체를 통하여 유사한 부분에 대해서는 동일한 도면 부호를 붙였다. 층, 막, 영역, 판 등의 부분이 다른 부분 "위에" 있다고 할 때, 이는 다른 부분 "바로 위에" 있는 경우 뿐만 아니라 그 중간에 또 다른 부분이 있는 경우도 포함한다. 반대로 어떤 부분이 다른 부분 "바로 위에" 있다고 할 때에는 중간에 다른 부분이 없는 것을 뜻한다.

[0047] 본 명세서에서 특별한 언급이 없는 한, "치환된"이란 적어도 하나의 수소 원자가 할로젠 원자, 히드록시기, C1 내지 C20 알킬기, C2 내지 C20 알케닐기, C2 내지 C20 알킬닐기, C1 내지 C20 알콕시기, C3 내지 C30 사이클로알킬기, C3 내지 C30 사이클로알케닐기, C3 내지 C30 사이클로알킬닐기, C2 내지 C30 헤테로사이클로알킬기, C2 내지 C30 헤테로사이클로알케닐기, C2 내지 C30 헤테로사이클로알킬닐기, C6 내지 C30 아릴기, C6 내지 C30 아릴옥시기, C3 내지 C30 헤테로아릴기, 아민기, 에스테르기, 카르복실기, 니트로기 또는 시아노기로 치환된 것을 의미한다.

[0048] 본 명세서에서 특별한 언급이 없는 한, "헤테로사이클로알킬기", "헤테로사이클로알케닐기", "헤테로사이클로알킬닐기" 및 "헤테로아릴기"는 각각 사이클로알킬기, 사이클로알케닐기, 사이클로알킬닐기 및 아릴기의 고리 내에 N, O, S 및 P 중 적어도 하나의 헤테로 원자를 포함하는 헤테로사이클로알킬기, 헤테로사이클로알케닐기, 헤테로사이클로알킬닐기 및 헤테로아릴기를 의미한다.

[0049] 일 구현예에 따른 금속 착체 화합물은 하기 화학식 1로 표시될 수 있다.

[0050] [화학식 1]



[0051]

[0052] (상기 화학식 1에서,

[0053] M은 2족 또는 3족의 금속 이온이며,

[0054] R¹ 내지 R⁸은 서로 동일하거나 상이하며, 수소 원자, 할로젠 원자, 히드록시기, 치환 또는 비치환된 C1 내지 C20 알킬기이고, 치환 또는 비치환된 C2 내지 C20 알케닐기, 치환 또는 비치환된 C2 내지 C20 알킬닐기, 치환 또는 비치환된 C1 내지 C20 알콕시기, 치환 또는 비치환된 C3 내지 C30 사이클로알킬기, 치환 또는 비치환된 C3 내지

C30 사이클로알케닐기, 치환 또는 비치환된 C3 내지 C30 사이클로알킬닐기, 치환 또는 비치환된 C2 내지 C30 헤테로사이클로알킬기, 치환 또는 비치환된 C2 내지 C30 헤테로사이클로알케닐기, 치환 또는 비치환된 C2 내지 C30 헤테로사이클로알킬닐기, 치환 또는 비치환된 C6 내지 C30 아릴기, 치환 또는 비치환된 C6 내지 C30 아릴옥시기, 치환 또는 비치환된 C3 내지 C30 헤테로아릴기, 아민기, 에스테르기, 카르복실기, 니트로기 또는 시아노기일 수 있고,

[0055] R^1 및 R^2 , R^2 및 R^3 , R^4 및 R^5 , 그리고 R^5 및 R^6 은 각각 서로 결합하여 치환 또는 비치환된 C6 내지 C30 아릴기, 치환 또는 비치환된 C6 내지 C30 아릴옥시기, 치환 또는 비치환된 C3 내지 C30 헤테로아릴기를 형성할 수도 있으며,

[0056] A^1 내지 A^6 은 서로 동일하거나 상이하며, 탄소 원자 또는 질소 원자이며,

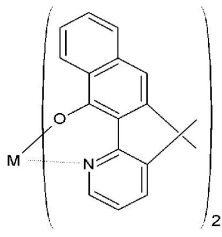
[0057] y는 2 또는 3이다.)

[0058] 상기 화학식 1에서의 R^1 내지 R^8 은 서로 동일하거나 상이하며, 수소 원자, 할로젠 원자, 치환 또는 비치환된 C1 내지 C20 알킬기이고, 치환 또는 비치환된 C6 내지 C30 아릴기, 치환 또는 비치환된 C6 내지 C30 아릴옥시기, 치환 또는 비치환된 C3 내지 C30 헤테로아릴기, 아민기, 에스테르기, 니트로기 또는 시아노기일 수 있다. 또한 R^1 및 R^2 , R^2 및 R^3 , R^4 및 R^5 , 그리고 R^5 및 R^6 은 각각 서로 결합하여 치환 또는 비치환된 C6 내지 C30 아릴기, 치환 또는 비치환된 C6 내지 C30 아릴옥시기, 치환 또는 비치환된 C3 내지 C30 헤테로아릴기를 형성할 수도 있다.

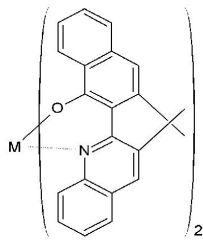
[0059] 또한 상기 화학식 1에서의 M은 Be, Zn, Mg, Ca, Y, B, Al, Ga, In 또는 이들의 조합일 수 있다.

[0060] 상기 금속 착체 화합물의 더욱 구체적인 예들은 하기 화학식 2-1 내지 2-147 중 어느 하나로 표시될 수 있으며, 반드시 이에 한정되지 않는다.

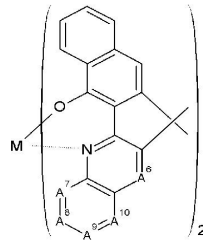
[화학식 2-1]



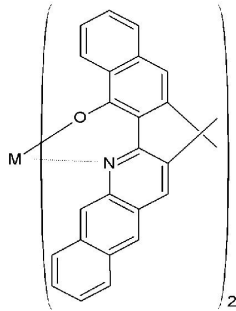
[화학식 2-2]



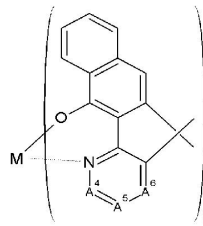
[화학식 2-3]



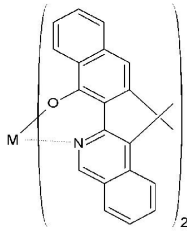
[화학식 2-4]



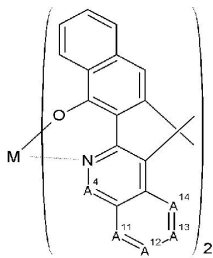
[화학식 2-5]



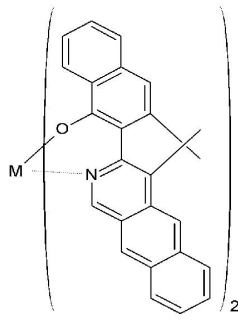
[화학식 2-6]



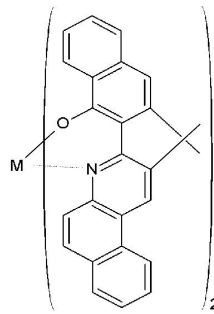
[화학식 2-7]



[화학식 2-8]

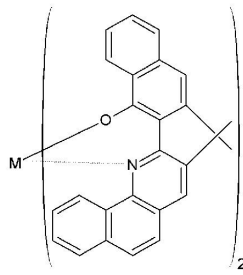


[화학식 2-9]

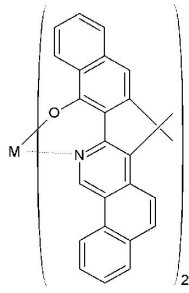


[0061]

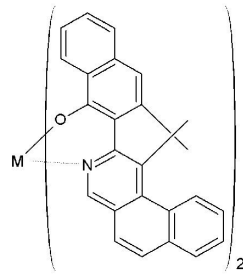
[화학식 2-10]



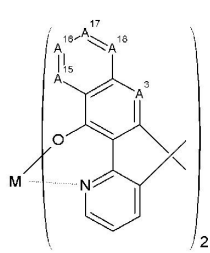
[화학식 2-11]



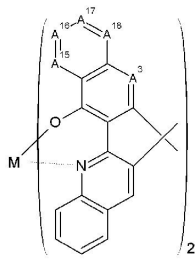
[화학식 2-12]



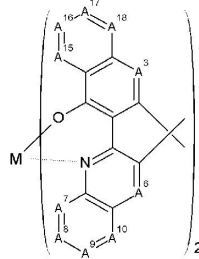
[화학식 2-13]



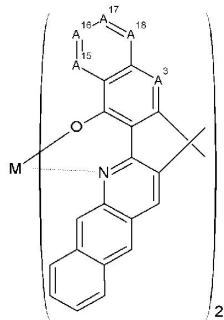
[화학식 2-14]



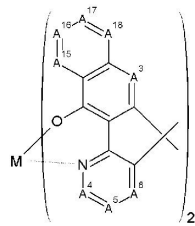
[화학식 2-15]



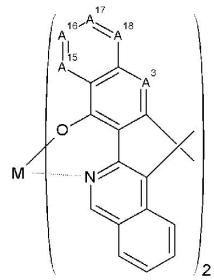
[화학식 2-16]



[화학식 2-17]

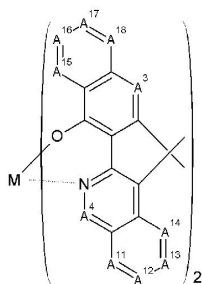


[화학식 2-18]

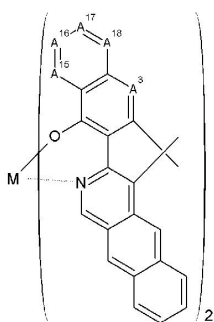


[0062]

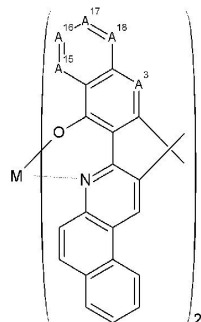
[화학식 2-19]



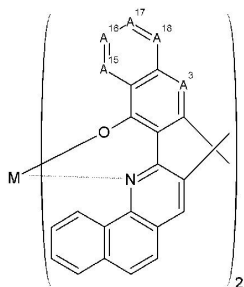
[화학식 2-20]



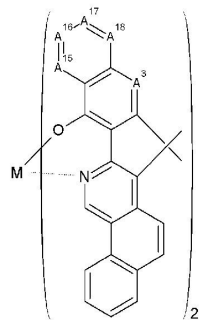
[화학식 2-21]



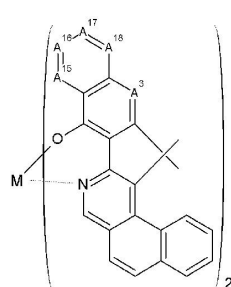
[화학식 2-22]



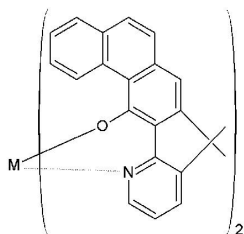
[화학식 2-23]



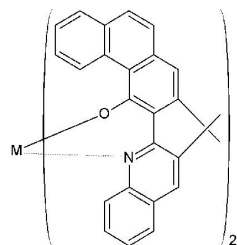
[화학식 2-24]



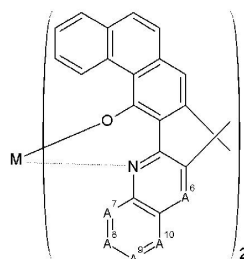
[화학식 2-25]



[화학식 2-26]

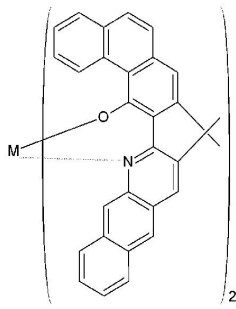


[화학식 2-27]

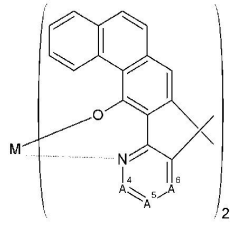


[0063]

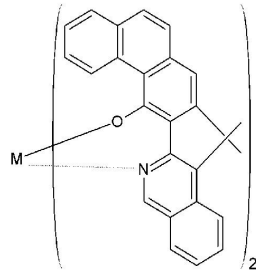
[화학식 2-28]



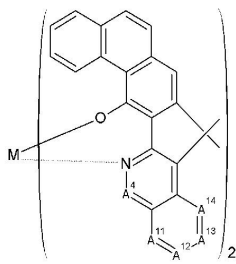
[화학식 2-29]



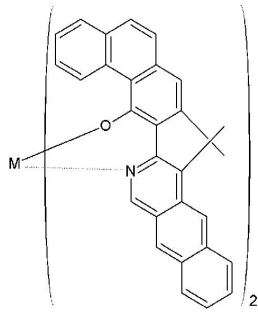
[화학식 2-30]



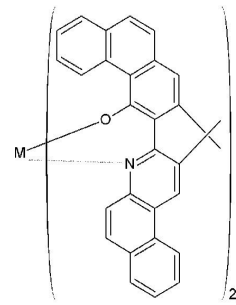
[화학식 2-31]



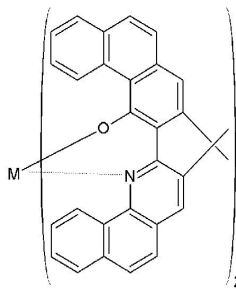
[화학식 2-32]



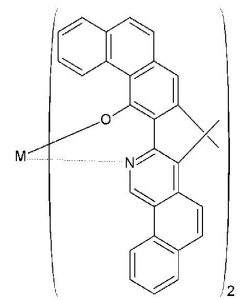
[화학식 2-33]



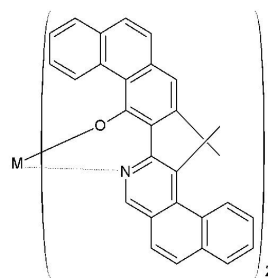
[화학식 2-34]



[화학식 2-35]

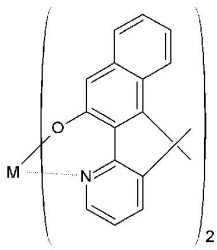


[화학식 2-36]

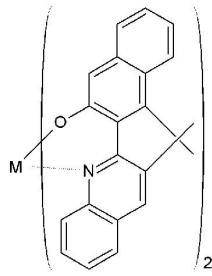


[0064]

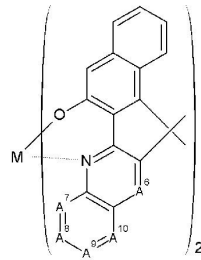
[화학식 2-37]



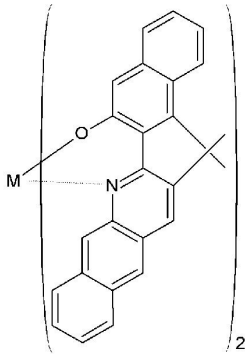
[화학식 2-38]



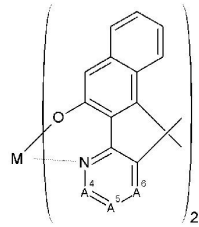
[화학식 2-39]



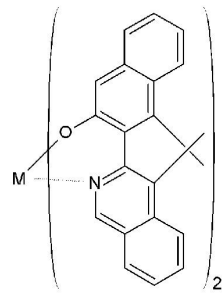
[화학식 2-40]



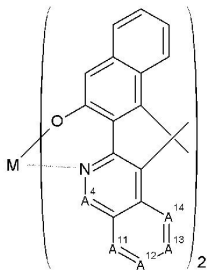
[화학식 2-41]



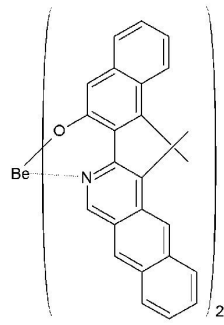
[화학식 2-42]



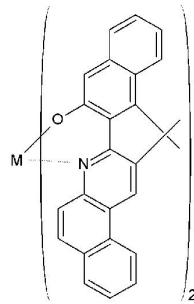
[화학식 2-43]



[화학식 2-44]

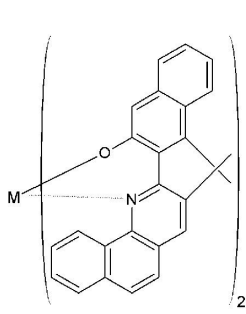


[화학식 2-45]

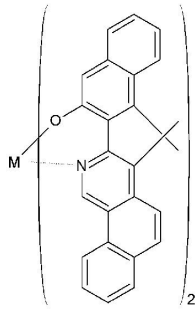


[0065]

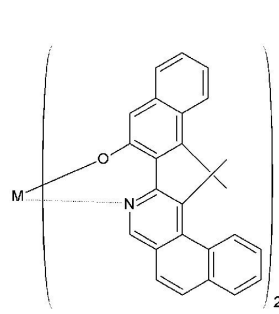
[화학식 2-46]



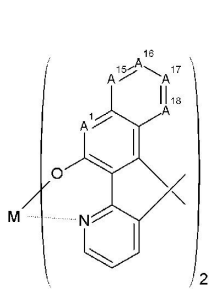
[화학식 2-47]



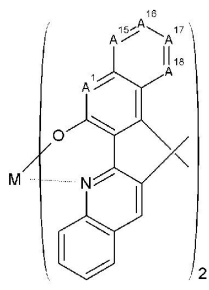
[화학식 2-48]



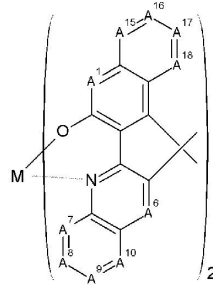
[화학식 2-49]



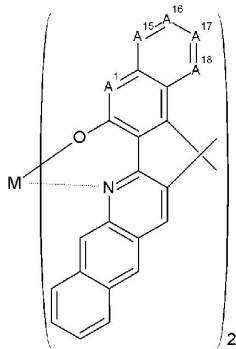
[화학식 2-50]



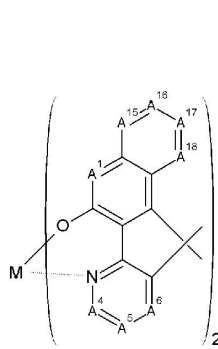
[화학식 2-51]



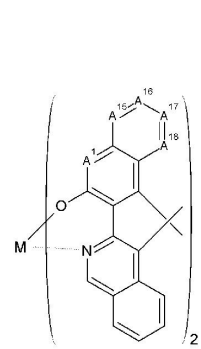
[화학식 2-52]



[화학식 2-53]

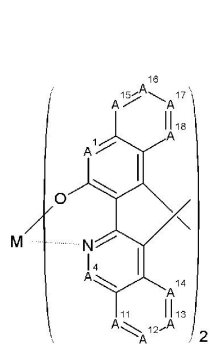


[화학식 2-54]

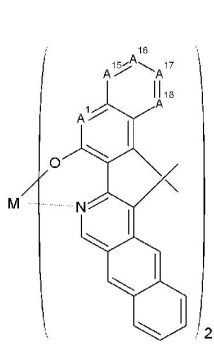


[0066]

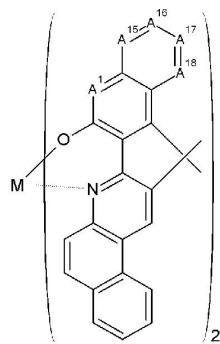
[화학식 2-55]



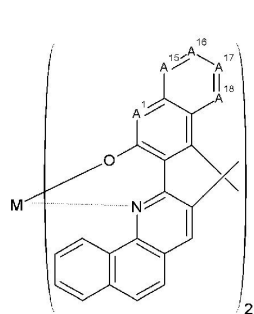
[화학식 2-56]



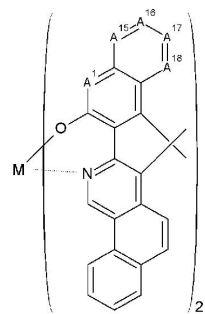
[화학식 2-57]



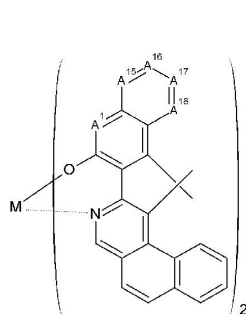
[화학식 2-58]



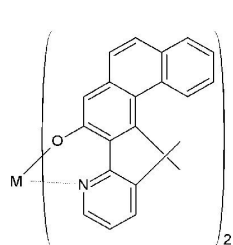
[화학식 2-59]



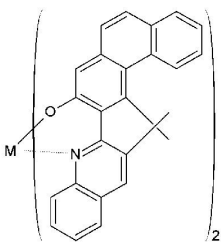
[화학식 2-60]



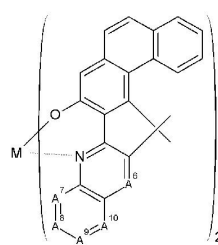
[화학식 2-61]



[화학식 2-62]

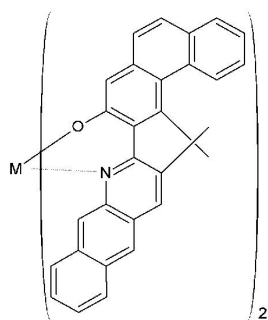


[화학식 2-63]

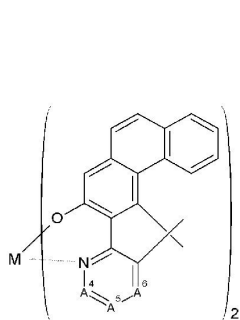


[0067]

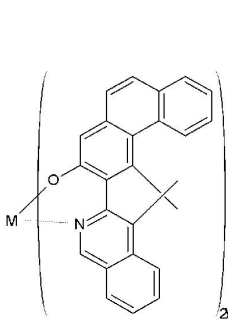
[화학식 2-64]



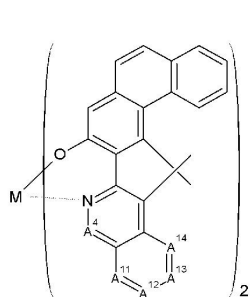
[화학식 2-65]



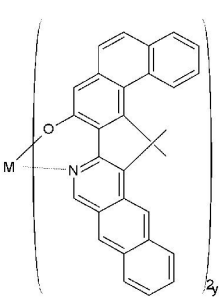
[화학식 2-66]



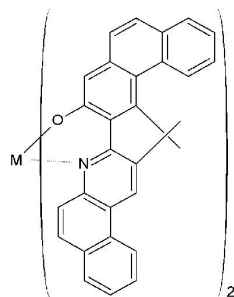
[화학식 2-67]



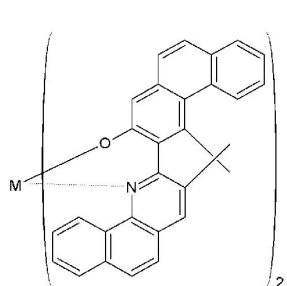
[화학식 2-68]



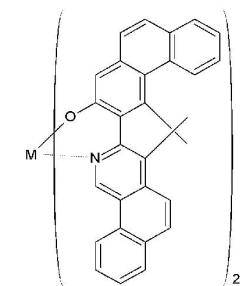
[화학식 2-69]



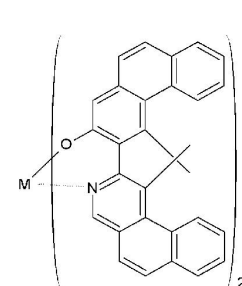
[화학식 2-70]



[화학식 2-71]

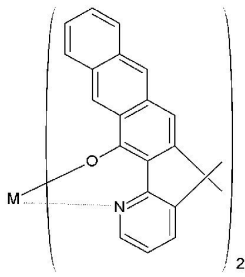


[화학식 2-72]

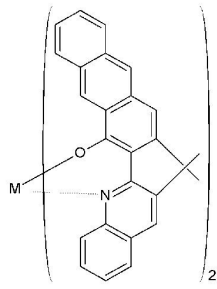


[0068]

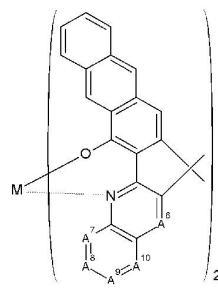
[화학식 2-73]



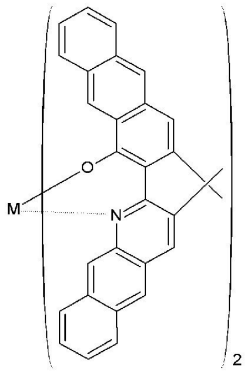
[화학식 2-74]



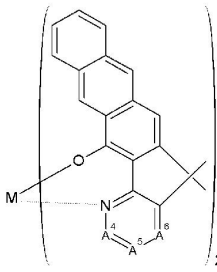
[화학식 2-75]



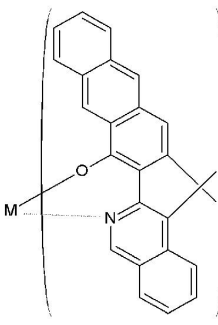
[화학식 2-76]



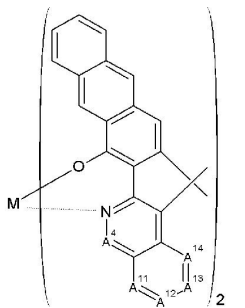
[화학식 2-77]



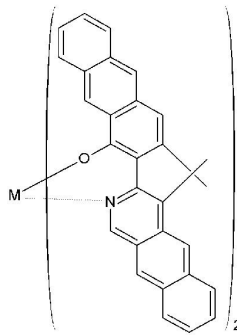
[화학식 2-78]



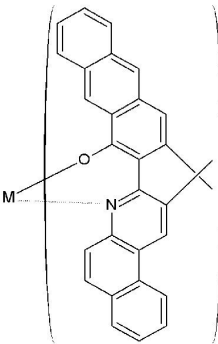
[화학식 2-79]



[화학식 2-80]

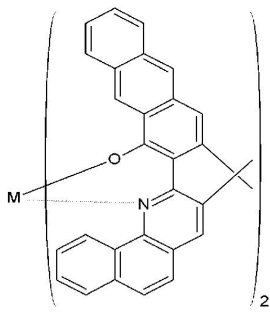


[화학식 2-81]

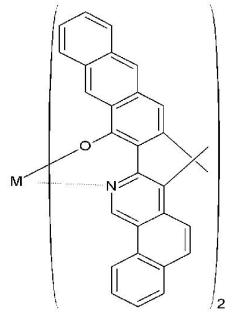


[0069]

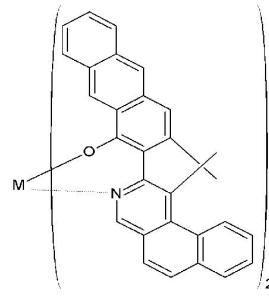
[화학식 2-82]



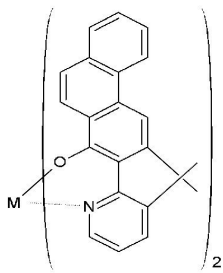
[화학식 2-83]



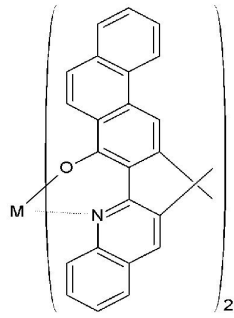
[화학식 2-84]



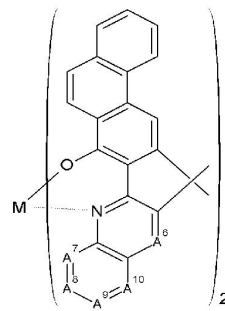
[화학식 2-85]



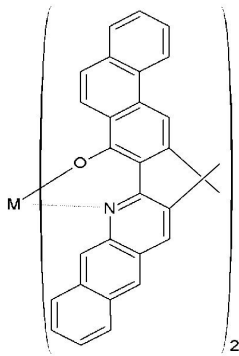
[화학식 2-86]



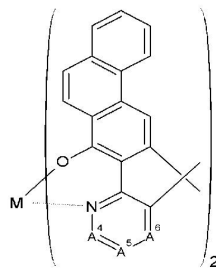
[화학식 2-87]



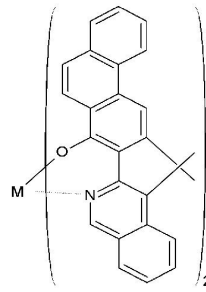
[화학식 2-88]



[화학식 2-89]

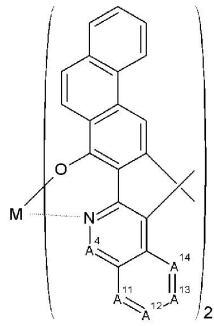


[화학식 2-90]

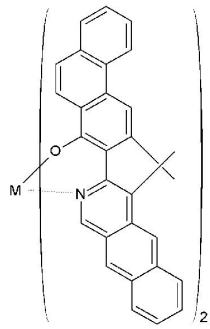


[0070]

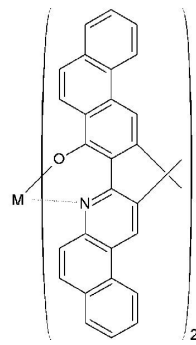
[화학식 2-91]



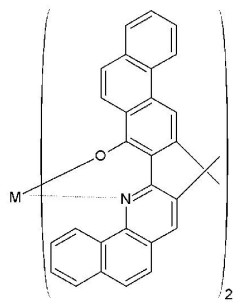
[화학식 2-92]



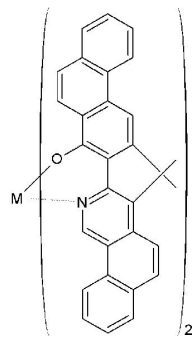
[화학식 2-93]



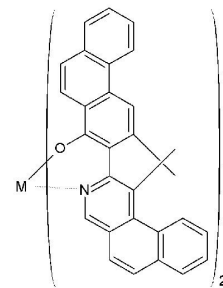
[화학식 2-94]



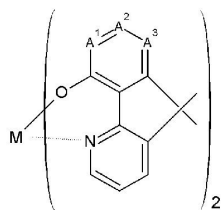
[화학식 2-95]



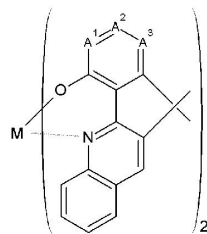
[화학식 2-96]



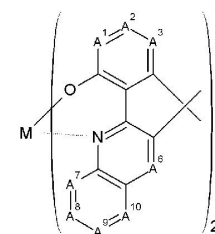
[화학식 2-97]



[화학식 2-98]

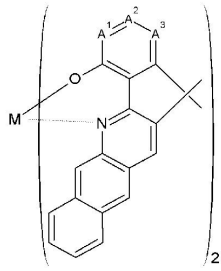


[화학식 2-99]

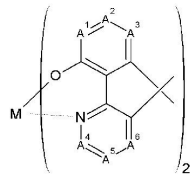


[0071]

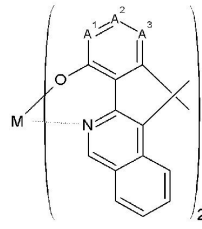
[화학식 2-100]



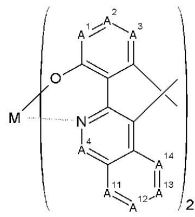
[화학식 2-101]



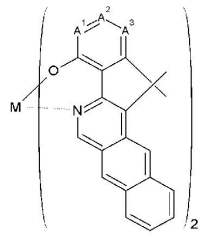
[화학식 2-102]



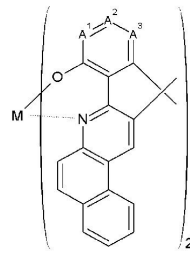
[화학식 2-103]



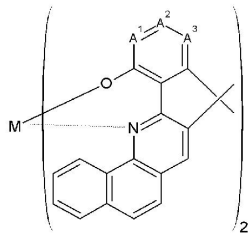
[화학식 2-104]



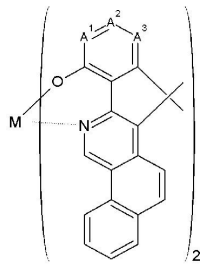
[화학식 2-105]



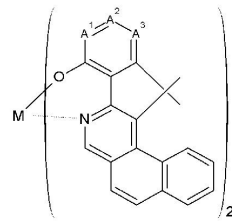
[화학식 2-106]



[화학식 2-107]

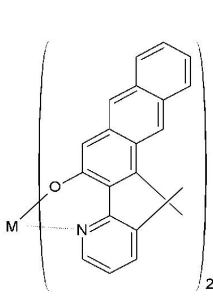


[화학식 2-108]

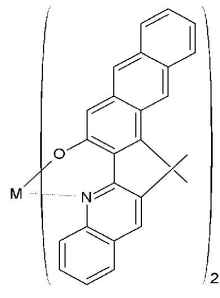


[0072]

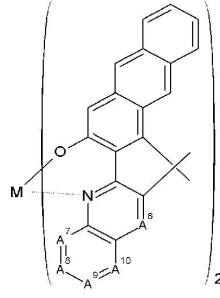
[화학식 2-109]



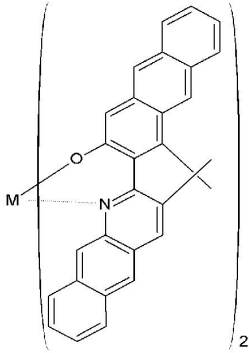
[화학식 2-110]



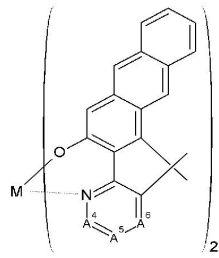
[화학식 2-111]



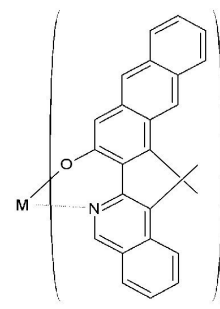
[화학식 2-112]



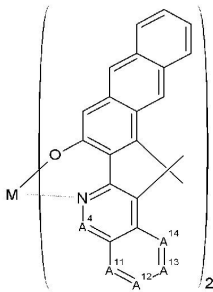
[화학식 2-113]



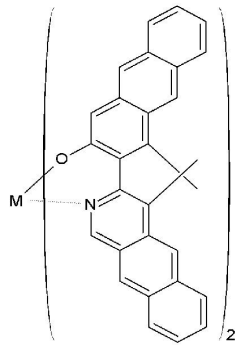
[화학식 2-114]



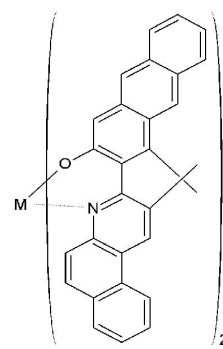
[화학식 2-115]



[화학식 2-116]

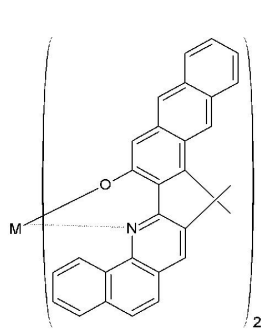


[화학식 2-117]

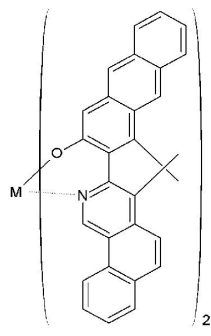


[0073]

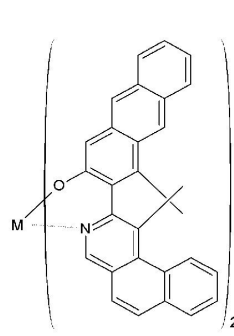
[화학식 2-118]



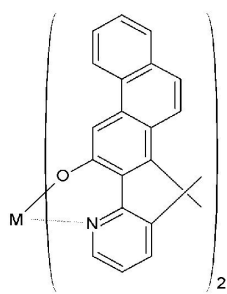
[화학식 2-119]



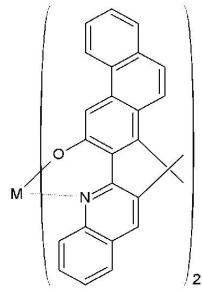
[화학식 2-120]



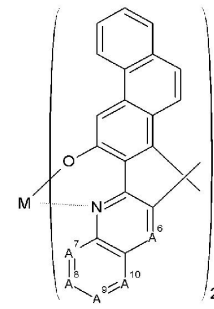
[화학식 2-121]



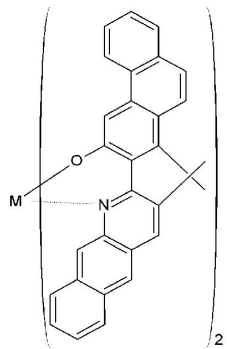
[화학식 2-122]



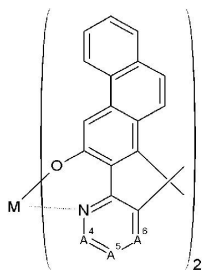
[화학식 2-123]



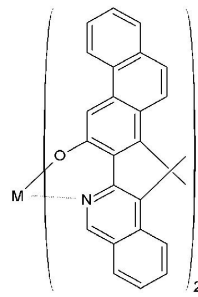
[화학식 2-124]



[화학식 2-125]

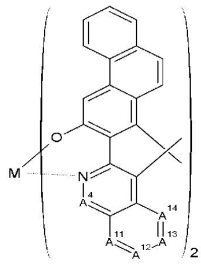


[화학식 2-126]

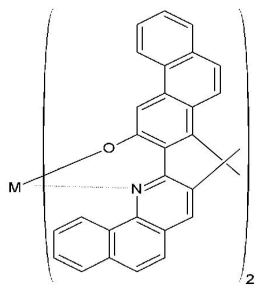


[0074]

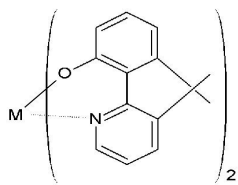
[화학식 2-127]



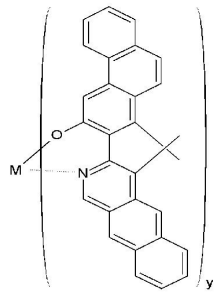
[화학식 2-130]



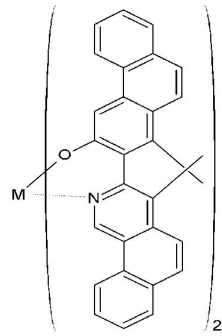
[화학식 2-133]



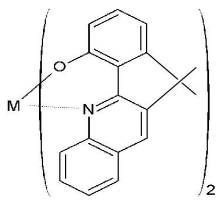
[화학식 2-128]



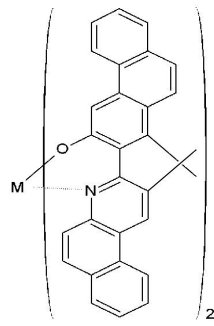
[화학식 2-131]



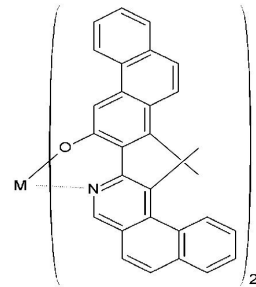
[화학식 2-134]



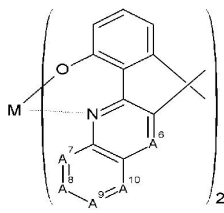
[화학식 2-129]



[화학식 2-132]

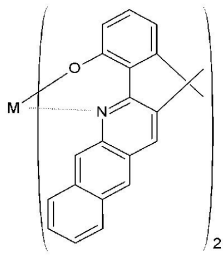


[화학식 2-135]

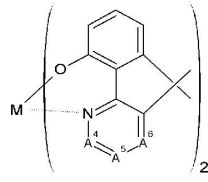


[0075]

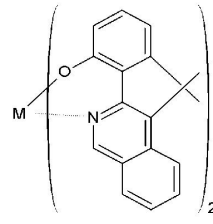
[화학식 2-136]



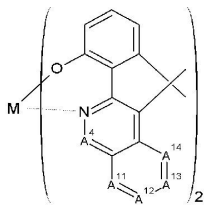
[화학식 2-137]



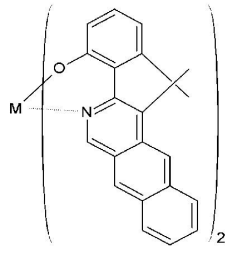
[화학식 2-138]



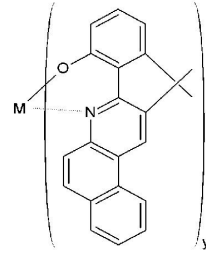
[화학식 2-139]



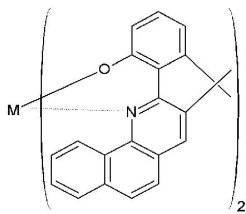
[화학식 2-140]



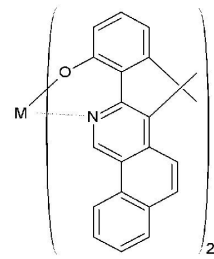
[화학식 2-141]



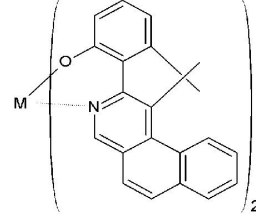
[화학식 2-142]



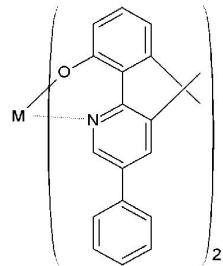
[화학식 2-143]



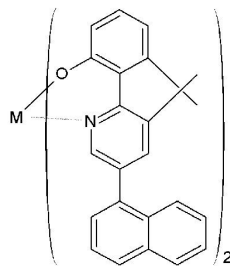
[화학식 2-144]



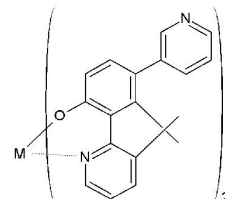
[화학식 2-145]



[화학식 2-146]



[화학식 2-147]



[0076]

[0077]

[0078]

[0079]

[0080]

[0081]

[0082]

[0083]

(상기 화학식 2-1 내지 2-147에서,

A^1 내지 A^{18} 은 서로 동일하거나 상이하며, 탄소 원자 또는 질소 원자이며, A^1 내지 A^{18} 중 적어도 하나는 질소 원자이고,

M은 Be 또는 Zn 이다.)

또 다른 일 구현예에 따른 유기 발광 장치에 대하여 도 1을 참고하여 설명한다.

도 1은 일 구현예에 따른 유기 발광 장치를 개략적으로 도시한 단면도이다.

도 1을 참고하면, 일 구현예에 따른 유기 발광 장치는 기관(100), 상기 기관 위에 위치하는 제1 전극(110), 상기 제1 전극(110) 위에 위치하는 유기층(120), 상기 유기층(120) 위에 위치하는 제2 전극(130)을 포함한다.

[0084] 상기 기판(100)은 통상적인 유기 발광 장치에 사용되는 기판을 사용할 수 있으며, 구체적으로는 유리 기판, 플라스틱 기판 등을 사용할 수 있다.

[0085] 상기 제1 전극(110)은 애노드(anode) 전극일 수 있으며, 투명 도전체 또는 불투명 도전체로 형성될 수 있다. 상기 투명 도전체의 예로는 ITO(indium tin oxide), IZO(indium zinc oxide), TO(tin oxide), ZnO(zinc oxide) 또는 이들의 조합일 수 있으며, 상기 불투명 도전체의 예로는 은(Ag), 마그네슘(Mg), 알루미늄(Al), 백금(Pt), 팔라듐(Pd), 금(Au), 니켈(Ni), 네오디뮴(Nd), 이리듐(Ir), 크롬(Cr) 또는 이들의 조합일 수 있다. 상기 제1 전극(110)이 투명 도전체로 형성되는 경우 하부로 빛을 내는 배면 발광(bottom emission)일 수 있다.

[0086] 상기 유기층(120)은 상기 제1 전극 위에 위치하는 순서대로, 정공 주입층(121), 정공 수송층(123), 발광층(125), 전자 수송층(127) 및 전자 주입층(129) 중 적어도 하나의 층을 포함한다.

[0087] 상기 유기층(120)을 형성하는 물질로는, 구체적으로는 상기 정공 주입층(121), 상기 정공 수송층(123), 상기 발광층(125), 상기 전자 수송층(127) 및 상기 전자 주입층(129) 중 적어도 하나의 층을 형성하는 물질로는 전술한 금속 착체 화합물이 사용된다. 더욱 구체적으로는 상기 발광층(125) 또는 상기 전자 수송층(127)을 형성하는 물질로 사용될 수 있다.

[0088] 상기 제2 전극(130)은 캐소드(cathode) 전극일 수 있으며, 투명 도전체 또는 불투명 도전체로 형성될 수 있다. 상기 투명 도전체의 예로는 ITO(indium tin oxide), IZO(indium zinc oxide), TO(tin oxide), ZnO(zinc oxide) 또는 이들의 조합일 수 있으며, 상기 불투명 도전체의 예로는 은(Ag), 마그네슘(Mg), 알루미늄(Al), 백금(Pt), 팔라듐(Pd), 금(Au), 니켈(Ni), 네오디뮴(Nd), 이리듐(Ir), 크롬(Cr) 또는 이들의 조합일 수 있다. 상기 제2 전극(130)이 투명 도전체로 형성되는 경우 상기 유기층(120)에서 방출되는 빛을 상부로 내는 전면 발광(top emission)일 수 있다.

[0089] 이와 같이 유기층을 형성하는 물질로서 상기 금속 착체 화합물을 사용할 경우, 유기 발광 장치의 발광 효율을 높이고 구동 전압을 낮출 수 있다.

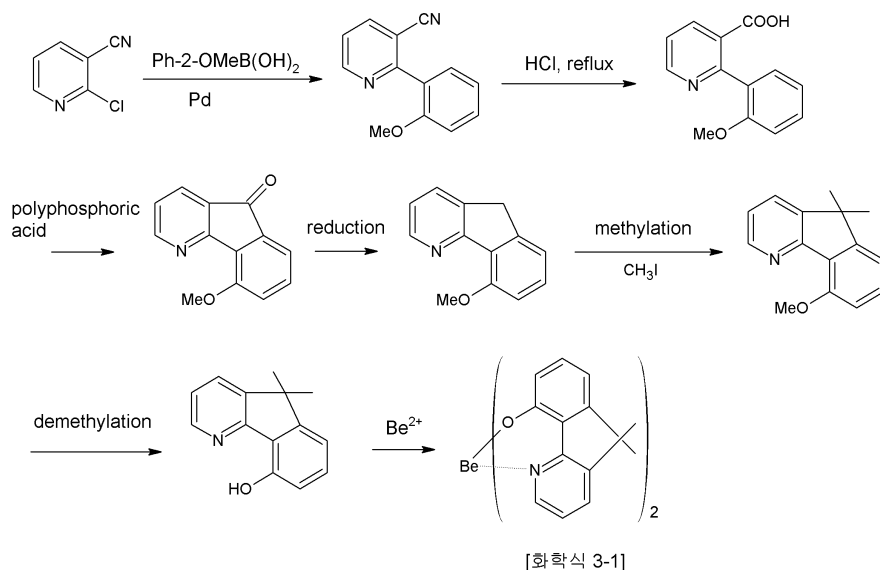
[0090] 이하 실시예를 통해서 본 발명을 보다 상세하게 설명한다. 다만 하기의 실시예는 단지 설명의 목적을 위한 것이며 본 발명의 범위를 제한하는 것은 아니다.

[0091] (금속 착체 화합물의 제조)

[0092] 실시예 1-1

[0093] 하기 반응식 1-1에 따라 하기 화학식 3-1로 표시되는 화합물을 제조하였다.

[0094] [반응식 1-1]



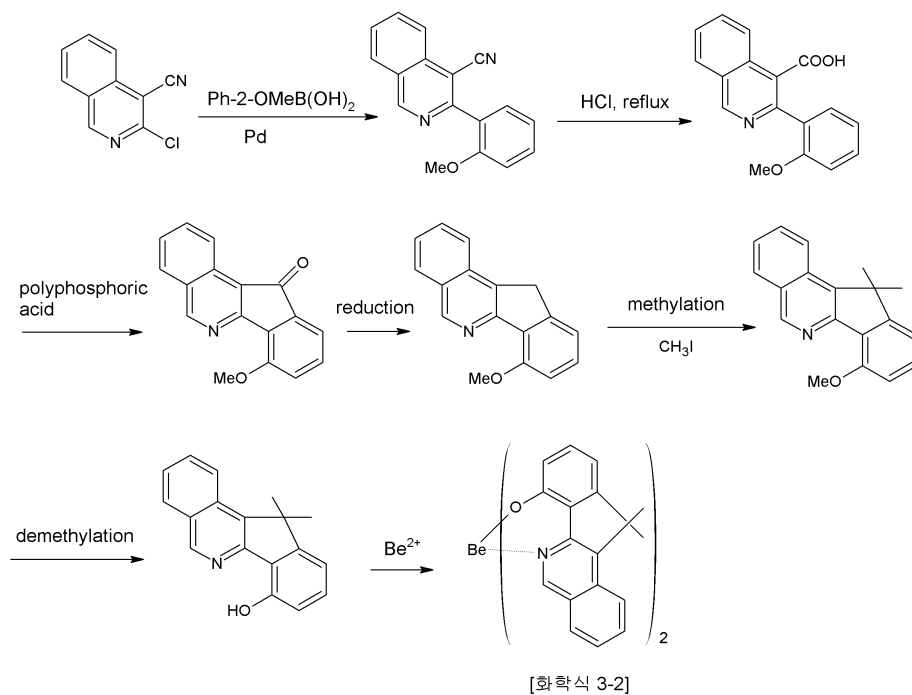
[0095]

[0096] 실시예 1-2

[0097] 하기 반응식 1-2에 따라 하기 화학식 3-2로 표시되는 화합물을 제조하였다.

[0098]

[반응식 1-2]



[0099]

[0100]

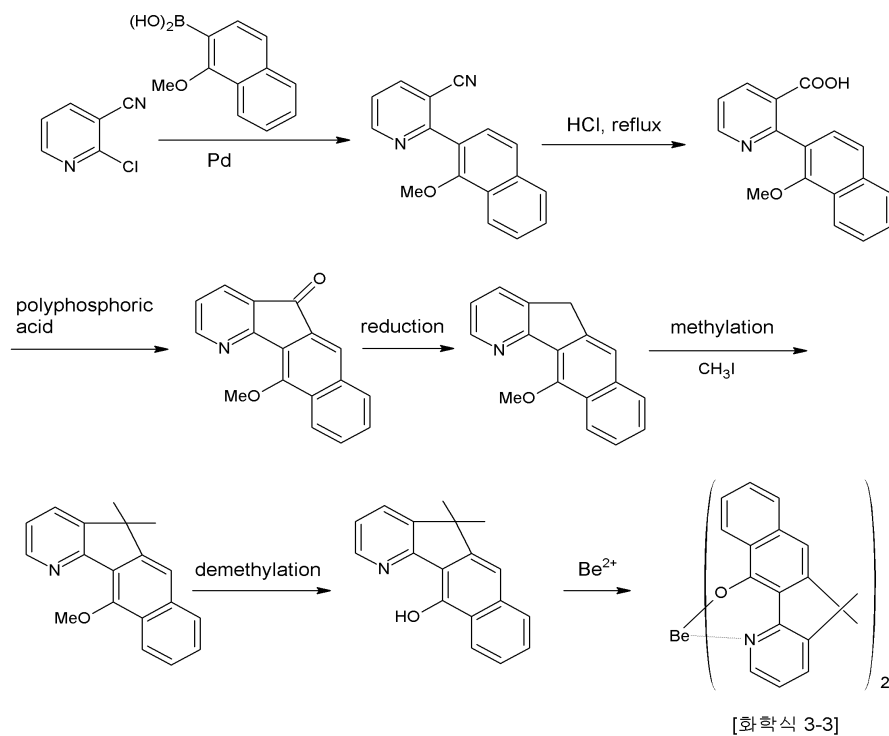
실시예 1-3

[0101]

하기 반응식 1-3에 따라 하기 화학식 3-3으로 표시되는 화합물을 제조하였다.

[0102]

[반응식 1-3]



[0103]

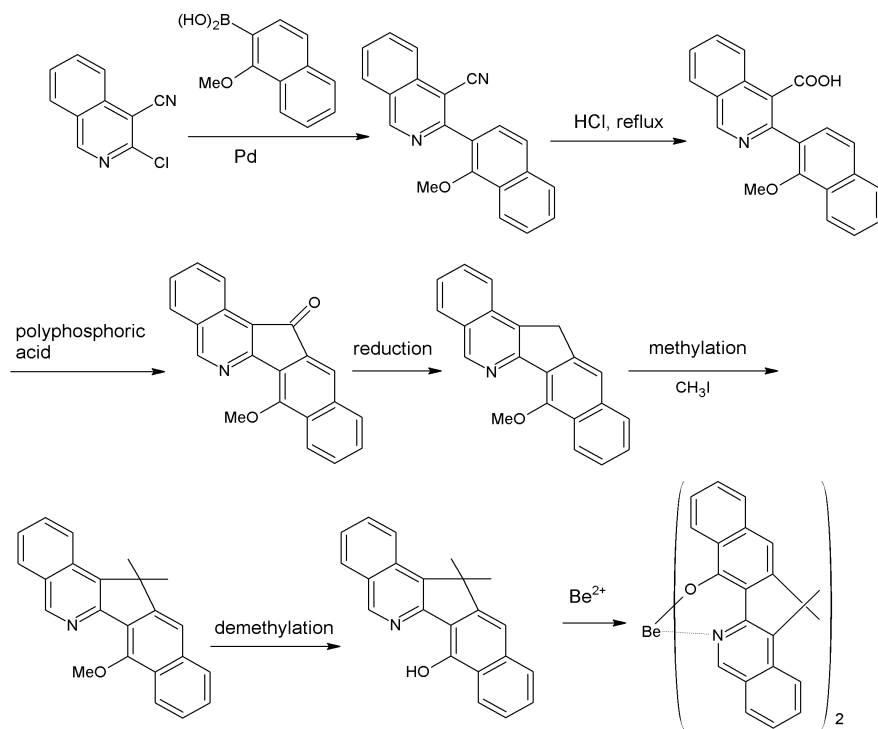
[0104]

실시예 1-4

[0105]

하기 반응식 1-4에 따라 하기 화학식 3-4로 표시되는 화합물을 제조하였다.

[0106] [반응식 1-4]



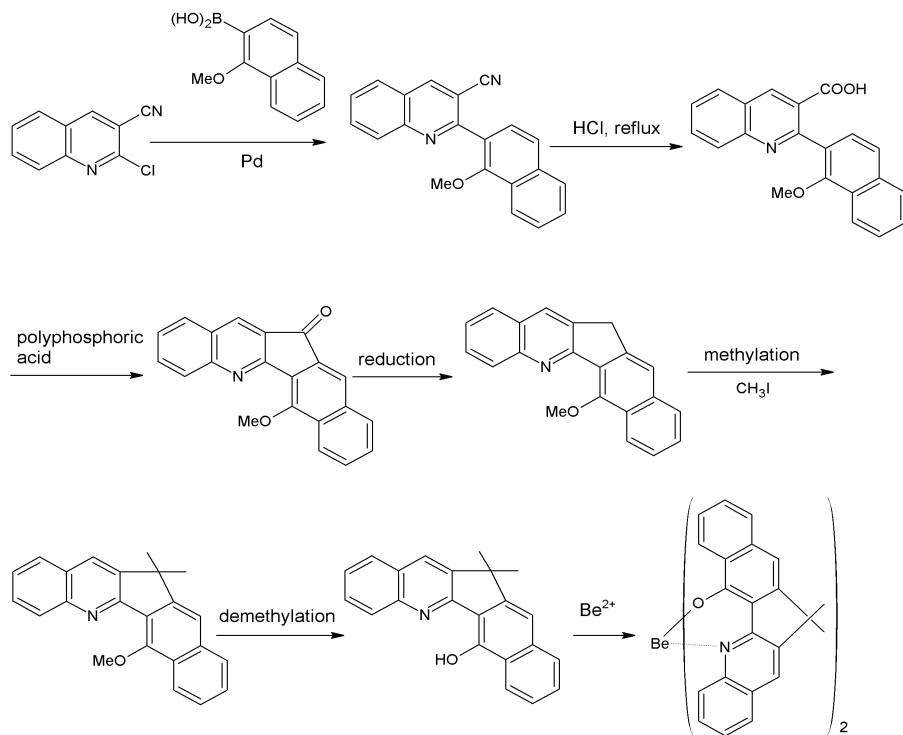
[화학식 3-4]

[0107]

[0108] 실시예 1-5

[0109] 하기 반응식 1-5에 따라 하기 화학식 3-5로 표시되는 화합물을 제조하였다.

[0110] [반응식 1-5]



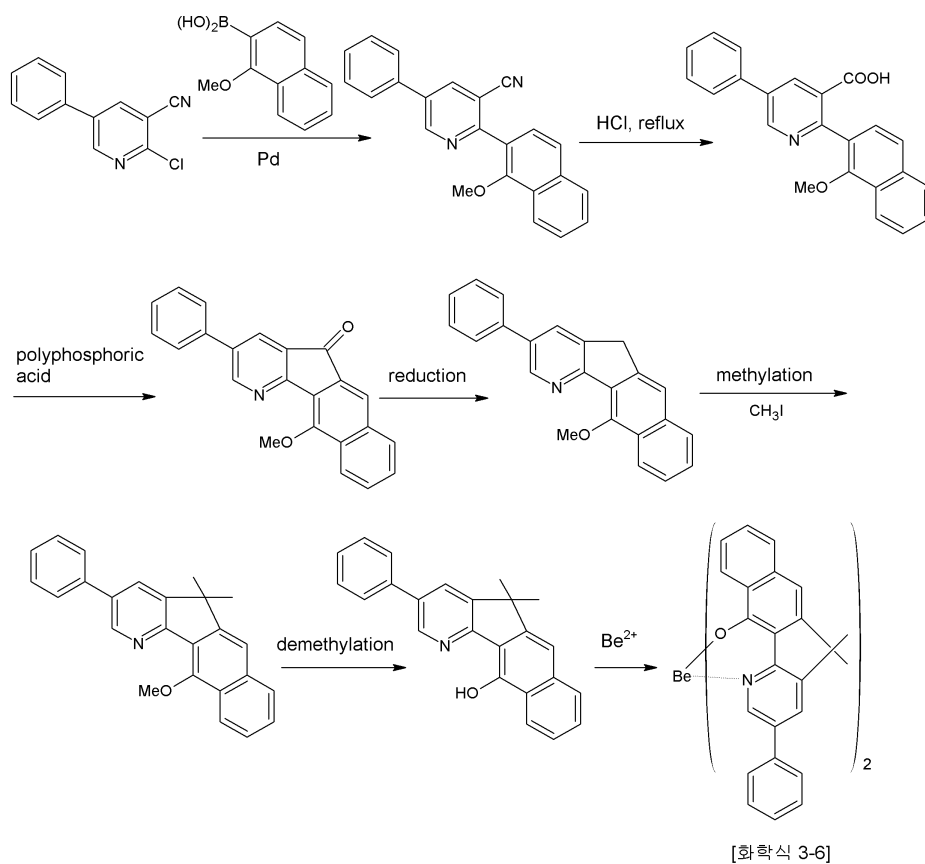
[화학식 3-5]

[0111]

[0112] 실시예 1-6

[0113] 하기 반응식 1-6에 따라 하기 화학식 3-6으로 표시되는 화합물을 제조하였다.

[반응식 1-6]

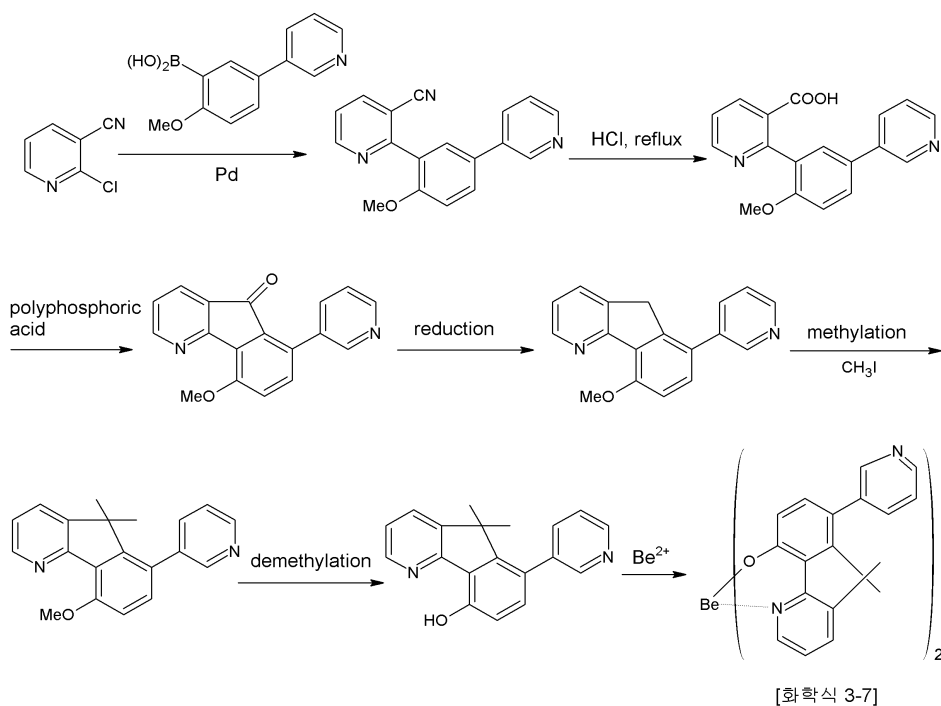


[0115]

[0116] **실시예 1-7**

[0117] 하기 반응식 1-7에 따라 하기 화학식 3-7로 표시되는 화합물을 제조하였다.

[반응식 1-7]

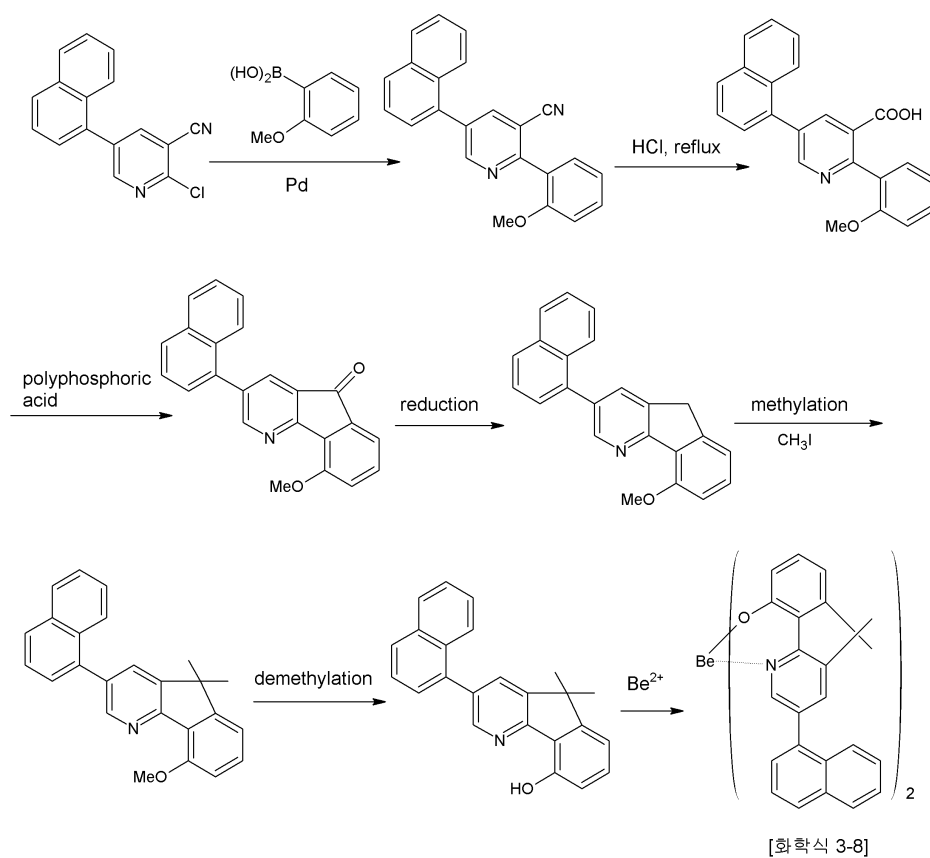


[0119]

[0120] **실시예 1-8**

[0121] 하기 반응식 1-8에 따라 하기 화학식 3-8로 표시되는 화합물을 제조하였다.

[0122] [반응식 1-8]



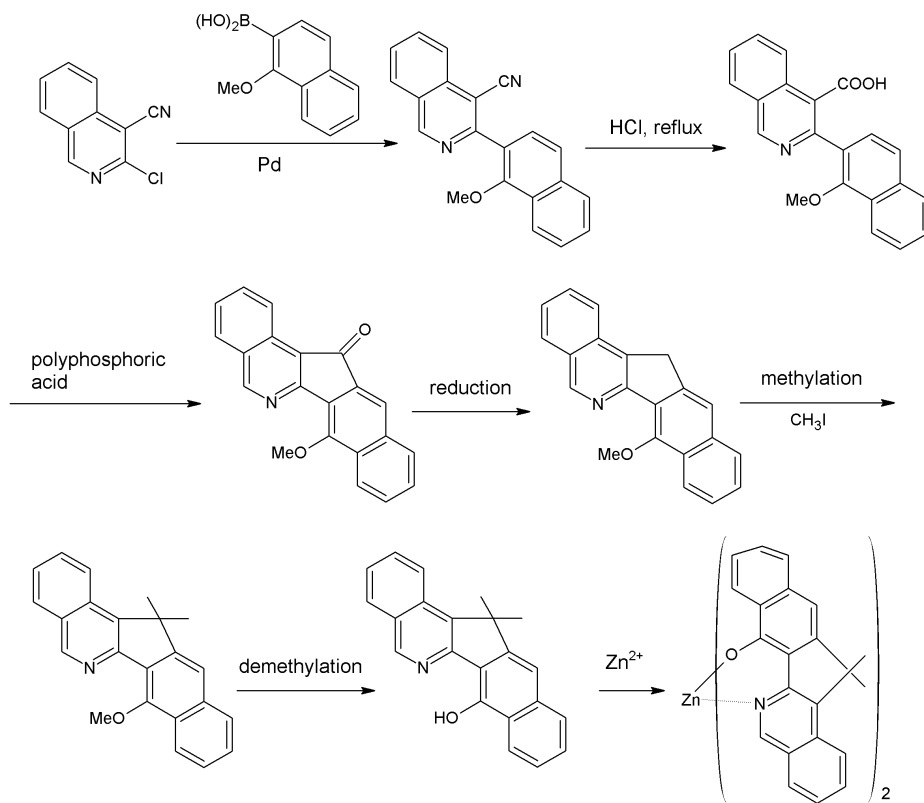
[0123]

[0124] **실시예 1-9**

[0125] 하기 반응식 1-9에 따라 하기 화학식 3-9로 표시되는 화합물을 제조하였다.

[0126]

[반응식 1-9]



[화학식 3-9]

[0127]

[0128]

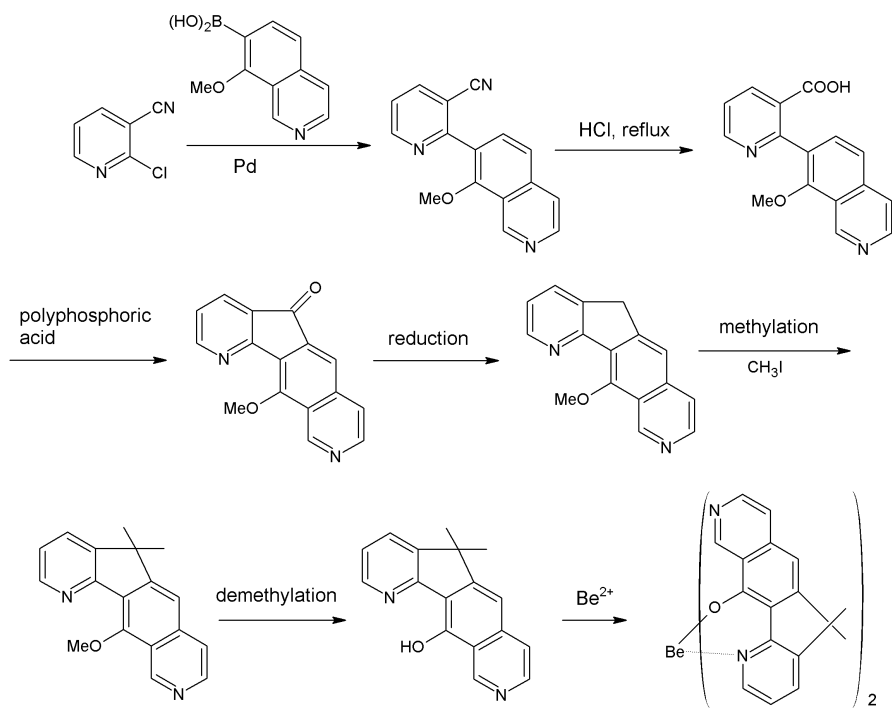
실시예 1-10

[0129]

하기 반응식 1-10에 따라 하기 화학식 3-10으로 표시되는 화합물을 제조하였다.

[0130]

[반응식 1-10]



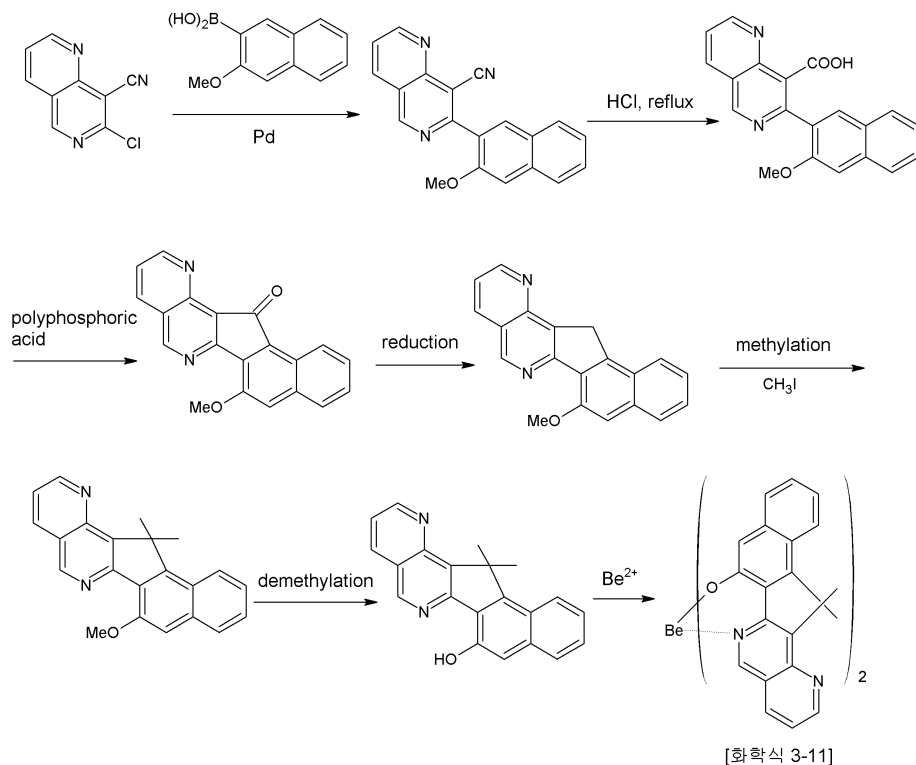
[화학식 3-10]

[0131]

[0132] **실시예 1-11**

[0133] 하기 반응식 1-11에 따라 하기 화학식 3-11로 표시되는 화합물을 제조하였다.

[0134] [반응식 1-11]

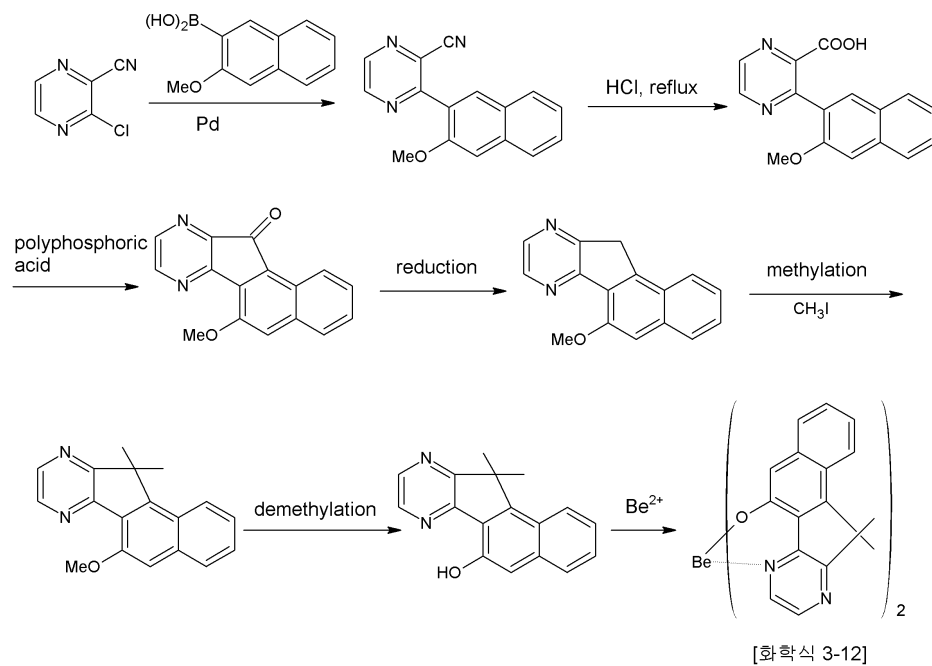


[0135]

[0136] **실시예 1-12**

[0137] 하기 반응식 1-12에 따라 하기 화학식 3-12로 표시되는 화합물을 제조하였다.

[0138] [반응식 1-12]

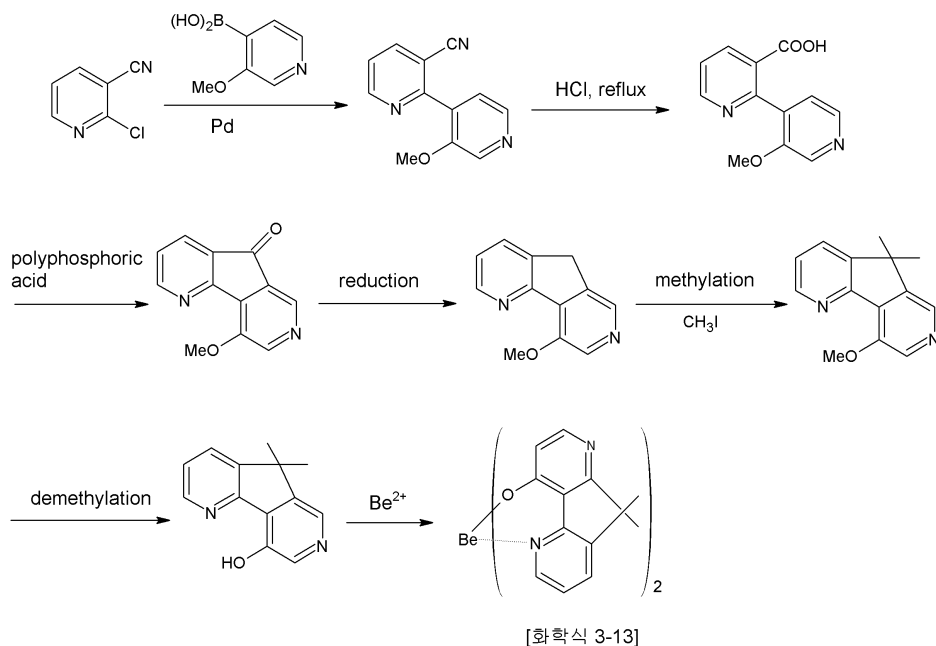


[0139]

[0140] **실시예 1-13**

[0141] 하기 반응식 1-13에 따라 하기 화학식 3-13으로 표시되는 화합물을 제조하였다.

[0142] [반응식 1-13]

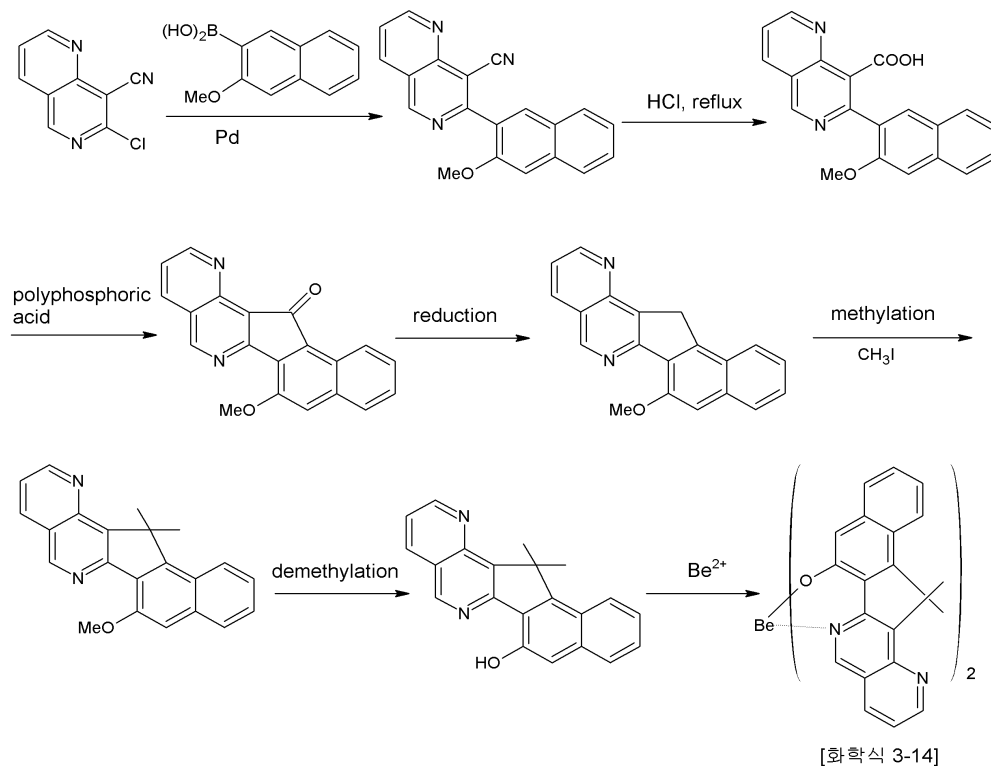


[0143]

[0144] **실시예 1-14**

[0145] 하기 반응식 1-14에 따라 하기 화학식 3-14로 표시되는 화합물을 제조하였다.

[0146] [반응식 1-14]

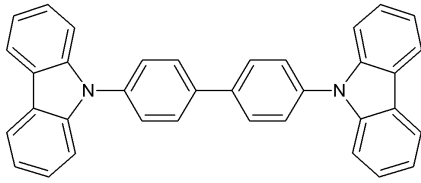


[0147]

[0148] **비교예 1-1**

[0149] 하기 화학식 4-1로 표시되는 화합물인, (4,4'-bis(N-carbazolyl)-1,1'-biphenyl)(CBP)을 사용하였다.

[0150] [화학식 4-1]

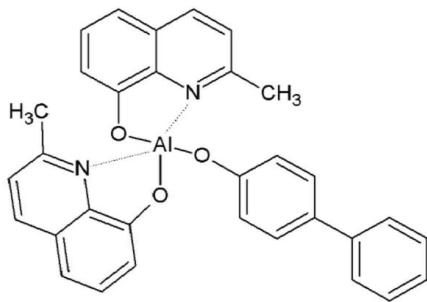


[0151]

[0152] **비교예 1-2**

[0153] 하기 화학식 4-2로 표시되는 화합물인, (aluminum(III)bis(2-methyl-8-quinolino)4-phenylphenolate)(BAIq)를 사용하였다.

[0154] [화학식 4-2]



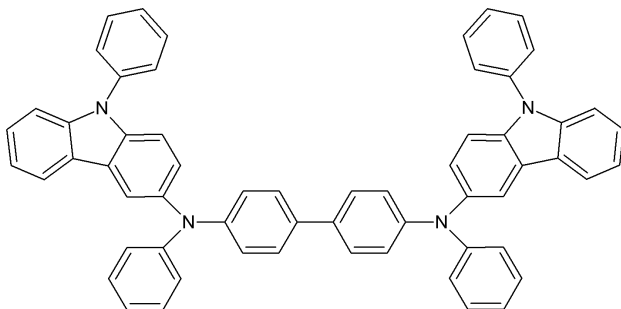
[0155]

[0156] (유기 발광 장치의 제작)

[0157] **실시예 2-1**

[0158] 유리 기판 위에 하부 전극으로 Ag/ITO를 적층하고 패터닝한 후, 그 위에 정공 주입층으로 하기 화학식 5-1로 표시되는 화합물을 70 nm의 두께로 증착하고, 그 위에 중간층(interlayer)으로 하기 화학식 5-2로 표시되는 화합물을 5 nm의 두께로 증착하고, 그 위에 정공 수송층으로 하기 화학식 5-3으로 표시되는 화합물을 100 nm의 두께로 증착하였다. 이어서 그 위에 도펀트로 하기 화학식 5-4로 표시되는 화합물 및 호스트로 상기 실시예 1-1에서 제조된 상기 화학식 3-1로 표시되는 화합물을 포함하는 인광 녹색 발광층을 40 nm의 두께로 증착하였다. 이어서 그 위에 전자 수송층으로 하기 화학식 5-5로 표시되는 화합물을 30 nm의 두께로 증착하고, 그 위에 전자 주입층으로 하기 화학식 5-6으로 표시되는 화합물을 0.5 nm의 두께로 증착하였다. 이어서 그 위에 상부 전극으로 MgAg를 200 nm의 두께로 증착하여, 유기 발광 장치를 제작하였다. 이때 상기 인광 녹색 발광층은 상기 도펀트를 상기 발광층 총량에 대하여 12 중량% 포함하고 있으며, 상기 전자 주입층은 상기 전자 수송층 및 상기 전자 주입층의 총량에 대하여 50 중량%로 포함하고 있다.

[0159] [화학식 5-1]

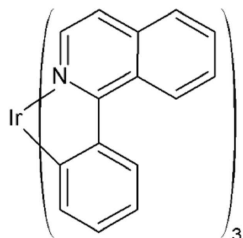


[0160]

- [0175] **실시예 2-4**
- [0176] 실시예 2-1에서 호스트로 상기 실시예 1-4에서 제조된 상기 화학식 3-4로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 2-1과 동일한 방법으로 유기 발광 장치를 제작하였다.
- [0177] **실시예 2-5**
- [0178] 실시예 2-1에서 호스트로 상기 실시예 1-5에서 제조된 상기 화학식 3-5로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 2-1과 동일한 방법으로 유기 발광 장치를 제작하였다.
- [0179] **실시예 2-6**
- [0180] 실시예 2-1에서 호스트로 상기 실시예 1-6에서 제조된 상기 화학식 3-6으로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 2-1과 동일한 방법으로 유기 발광 장치를 제작하였다.
- [0181] **실시예 2-7**
- [0182] 실시예 2-1에서 호스트로 상기 실시예 1-7에서 제조된 상기 화학식 3-7로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 2-1과 동일한 방법으로 유기 발광 장치를 제작하였다.
- [0183] **실시예 2-8**
- [0184] 실시예 2-1에서 호스트로 상기 실시예 1-8에서 제조된 상기 화학식 3-8로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 2-1과 동일한 방법으로 유기 발광 장치를 제작하였다.
- [0185] **실시예 2-9**
- [0186] 실시예 2-1에서 호스트로 상기 실시예 1-9에서 제조된 상기 화학식 3-9로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 2-1과 동일한 방법으로 유기 발광 장치를 제작하였다.
- [0187] **실시예 2-10**
- [0188] 실시예 2-1에서 호스트로 상기 실시예 1-10에서 제조된 상기 화학식 3-10으로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 2-1과 동일한 방법으로 유기 발광 장치를 제작하였다.
- [0189] **실시예 2-11**
- [0190] 실시예 2-1에서 호스트로 상기 실시예 1-11에서 제조된 상기 화학식 3-11로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 2-1과 동일한 방법으로 유기 발광 장치를 제작하였다.
- [0191] **실시예 2-12**
- [0192] 실시예 2-1에서 호스트로 상기 실시예 1-12에서 제조된 상기 화학식 3-12로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 2-1과 동일한 방법으로 유기 발광 장치를 제작하였다.
- [0193] **실시예 2-13**
- [0194] 실시예 2-1에서 호스트로 상기 실시예 1-13에서 제조된 상기 화학식 3-13으로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 2-1과 동일한 방법으로 유기 발광 장치를 제작하였다.
- [0195] **실시예 2-14**
- [0196] 실시예 2-1에서 호스트로 상기 실시예 1-14에서 제조된 상기 화학식 3-14로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 2-1과 동일한 방법으로 유기 발광 장치를 제작하였다.
- [0197] **비교예 2**
- [0198] 실시예 2-1에서 호스트로 상기 비교예 1-1에서 제조된 상기 화학식 4-1로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 2-1과 동일한 방법으로 유기 발광 장치를 제작하였다.
- [0199] **실시예 3-1**
- [0200] 유리 기판 위에 하부 전극으로 Ag/ITO를 적층하고 패터닝한 후, 그 위에 정공 주입층으로 상기 화학식 5-1로 표시되는 화합물을 70 nm의 두께로 증착하고, 그 위에 중간층(interlayer)으로 상기 화학식 5-2로 표시되는 화합물을 5 nm의 두께로 증착하고, 그 위에 정공 수송층으로 상기 화학식 5-3으로 표시되는 화합물을 155 nm의 두께

로 증착하였다. 이어서 그 위에 도펀트로 하기 화학식 5-7로 표시되는 화합물 및 호스트로 상기 실시예 1-1에서 제조된 상기 화학식 3-1로 표시되는 화합물을 포함하는 인광 적색 발광층을 40 nm의 두께로 증착하였다. 이어서 그 위에 전자 수송층으로 상기 화학식 5-5로 표시되는 화합물을 30 nm의 두께로 증착하고, 그 위에 전자 주입층으로 상기 화학식 5-6으로 표시되는 화합물을 0.5 nm의 두께로 증착하였다. 이어서 그 위에 상부 전극으로 MgAg를 200 nm의 두께로 증착하여, 유기 발광 장치를 제작하였다. 이때 상기 인광 적색 발광층은 상기 도펀트를 상기 발광층 총량에 대하여 10 중량% 포함하고 있으며, 상기 전자 주입층은 상기 전자 수송층 및 상기 전자 주입층의 총량에 대하여 50 중량%로 포함하고 있다.

[0201] [화학식 5-7]



[0202]

[0203] **실시예 3-2**

[0204] 실시예 3-1에서 호스트로 상기 실시예 1-2에서 제조된 상기 화학식 3-2로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 3-1과 동일한 방법으로 유기 발광 장치를 제작하였다.

[0205] **실시예 3-3**

[0206] 실시예 3-1에서 호스트로 상기 실시예 1-3에서 제조된 상기 화학식 3-3으로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 3-1과 동일한 방법으로 유기 발광 장치를 제작하였다.

[0207] **실시예 3-4**

[0208] 실시예 3-1에서 호스트로 상기 실시예 1-4에서 제조된 상기 화학식 3-4로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 3-1과 동일한 방법으로 유기 발광 장치를 제작하였다.

[0209] **실시예 3-5**

[0210] 실시예 3-1에서 호스트로 상기 실시예 1-5에서 제조된 상기 화학식 3-5로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 3-1과 동일한 방법으로 유기 발광 장치를 제작하였다.

[0211] **실시예 3-6**

[0212] 실시예 3-1에서 호스트로 상기 실시예 1-6에서 제조된 상기 화학식 3-6으로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 3-1과 동일한 방법으로 유기 발광 장치를 제작하였다.

[0213] **실시예 3-7**

[0214] 실시예 3-1에서 호스트로 상기 실시예 1-7에서 제조된 상기 화학식 3-7로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 3-1과 동일한 방법으로 유기 발광 장치를 제작하였다.

[0215] **실시예 3-8**

[0216] 실시예 3-1에서 호스트로 상기 실시예 1-8에서 제조된 상기 화학식 3-8로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 3-1과 동일한 방법으로 유기 발광 장치를 제작하였다.

[0217] **실시예 3-9**

[0218] 실시예 3-1에서 호스트로 상기 실시예 1-9에서 제조된 상기 화학식 3-9로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 3-1과 동일한 방법으로 유기 발광 장치를 제작하였다.

[0219] **실시예 3-10**

[0220] 실시예 3-1에서 호스트로 상기 실시예 1-10에서 제조된 상기 화학식 3-10으로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 3-1과 동일한 방법으로 유기 발광 장치를 제작하였다.

[0221] **실시예 3-11**

[0222] 실시예 3-1에서 호스트로 상기 실시예 1-11에서 제조된 상기 화학식 3-11로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 3-1과 동일한 방법으로 유기 발광 장치를 제작하였다.

[0223] **실시예 3-12**

[0224] 실시예 3-1에서 호스트로 상기 실시예 1-12에서 제조된 상기 화학식 3-12로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 3-1과 동일한 방법으로 유기 발광 장치를 제작하였다.

[0225] **실시예 3-13**

[0226] 실시예 3-1에서 호스트로 상기 실시예 1-13에서 제조된 상기 화학식 3-13으로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 3-1과 동일한 방법으로 유기 발광 장치를 제작하였다.

[0227] **실시예 3-14**

[0228] 실시예 3-1에서 호스트로 상기 실시예 1-14에서 제조된 상기 화학식 3-14로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 3-1과 동일한 방법으로 유기 발광 장치를 제작하였다.

[0229] **비교예 3**

[0230] 실시예 3-1에서 호스트로 상기 비교예 1-2에서 제조된 상기 화학식 4-2로 표시되는 화합물을 사용하는 것을 제외하고는 실시예 3-1과 동일한 방법으로 유기 발광 장치를 제작하였다.

[0231] **평가 1**

[0232] 실시예 2-1 내지 2-14 및 비교예 2에 따른 유기 발광 장치의 발광 효율 및 색 특성을 평가하였으며, 그 결과를 하기 표 1에 나타내었다.

표 1

[0233]

	전압(V)	효율(cd/A)	색좌표(CIE)		최대 발광 파장($\lambda_{\max}$) (nm)
			x	y	
실시예 2-1	5.3	42	0.330	0.612	518
실시예 2-2	4.8	39	0.327	0.611	517
실시예 2-3	4.8	38	0.328	0.613	517
실시예 2-4	5.0	35	0.325	0.615	516
실시예 2-5	5.1	35	0.326	0.614	516
실시예 2-6	5.3	41	0.328	0.611	517
실시예 2-7	5.4	40	0.331	0.613	518
실시예 2-8	5.3	39	0.330	0.613	518
실시예 2-9	5.8	34	0.329	0.613	517
실시예 2-10	5.1	37	0.329	0.612	517
실시예 2-11	4.8	40	0.327	0.611	517
실시예 2-12	5.3	35	0.326	0.615	516
실시예 2-13	5.3	36	0.330	0.613	518
실시예 2-14	5.0	34	0.326	0.615	516
비교예 2	6.1	33	0.327	0.611	517

[0234] 표 1을 참고하면, 실시예 2-1 내지 2-14에 따른 유기 발광 장치는 비교예 2에 따른 유기 발광 장치와 비교하여 효율이 높으며 유사한 정도의 색 좌표를 나타내는 것을 알 수 있다.

[0235] **평가 2**

[0236] 실시예 3-1 내지 3-14 및 비교예 3에 따른 유기 발광 장치의 발광 효율 및 색 특성을 평가하였으며, 그 결과를 하기 표 2에 나타내었다.

표 2

	전압(V)	효율(cd/A)	색좌표(CIE)		최대 발광 파장($\lambda_{\max}$) (nm)
			x	y	
실시예 3-1	5.4	20	0.661	0.338	625
실시예 3-2	4.7	23	0.663	0.337	626
실시예 3-3	4.7	24	0.662	0.338	625
실시예 3-4	4.2	29	0.660	0.340	624
실시예 3-5	4.3	30	0.661	0.339	625
실시예 3-6	4.8	23	0.661	0.338	625
실시예 3-7	4.9	22	0.660	0.340	625
실시예 3-8	5.1	21	0.662	0.338	626
실시예 3-9	4.7	26	0.660	0.340	625
실시예 3-10	4.9	25	0.662	0.337	625
실시예 3-11	4.6	27	0.660	0.340	624
실시예 3-12	5.1	23	0.662	0.338	625
실시예 3-13	5.3	21	0.661	0.339	625
실시예 3-14	4.9	24	0.660	0.340	625
비교예 3	5.6	19	0.661	0.338	625

[0237] 표 2를 참고하면, 실시예 3-1 내지 3-14에 따른 유기 발광 장치는 비교예 3에 따른 유기 발광 장치와 비교하여 효율이 높으며 유사한 정도의 색 좌표를 나타내는 것을 알 수 있다.

[0239] 이상에서 본 발명의 바람직한 실시예들에 대하여 상세하게 설명하였지만 본 발명의 권리 범위는 이에 한정되는 것은 아니고 다음의 청구 범위에서 정의하고 있는 본 발명의 기본 개념을 이용한 당업자의 여러 변형 및 개량 형태 또한 본 발명의 권리 범위에 속하는 것이다.

부호의 설명

- [0240] 100: 기판
 110: 제1 전극
 120: 유기층
 121: 정공 주입층
 123: 정공 수송층
 125: 발광층
 127: 전자 수송층
 129: 전자 주입층
 130: 제2 전극

도면

도면1

	130	
	129	
	127	
	125	120
	123	
	121	
	110	
	100	

专利名称(译)	金属络合物及其包括的有机发光器件		
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申请号	KR1020100068017	申请日	2010-07-14
[标]申请(专利权)人(译)	三星显示有限公司		
申请(专利权)人(译)	三星显示器有限公司		
当前申请(专利权)人(译)	三星显示器有限公司		
[标]发明人	HAMADA YUJI 하마다유지 LEE KWAN HEE 이관희		
发明人	하마다유지 이관희		
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其他公开文献	KR101201721B1		
外部链接	Espacenet		

摘要(译)

提供由以下化学式1表示的金属络合物和包含其的有机发光装置。 [化学式1]图像的存在 (特殊参考) (或化学式1中的M , R 1至R 8 , 以及A 1至A 6和y如说明书中所定义) 。

	~130
	~129
	~127
	~125
	~123
	~121
	~110
	~100