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전체 청구항 수 : 총 8 항

(54) 발명의 명칭 **유기전자소자용 화합물, 이를 포함하는 유기전자소자 및 유기전자소자를 포함하는 표시장치**

(57) 요 약

본 기재는, 화학식 1로 표시되는 유기전자소자용 화합물 이를 포함하는 유기전자소자 및 유기전자소자를 포함하는 표시장치에 관한 것으로, 화학식 1에 대한 구체적인 내용은 명세서 상에 정의된 것과 같다.

(52) CPC특허분류
H01L 51/50 (2013.01)

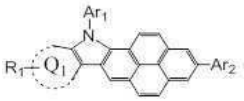
명 세 서

청구범위

청구항 1

하기 화학식 1로 표시되는 유기전자소자용 화합물:

[화학식 1]



Q_1은 치환 또는 비치환된 탄소수 6 내지 30의 방향족 탄화수소 고리 또는 치환 또는 비치환된 탄소수 5 내지 30의 방향족 헤테로 고리이고;

R_1은 수소, 치환 또는 비치환된 탄소수 1 내지 30의 알킬기, 치환 또는 비치환된 탄소수 2 내지 30의 알케닐기, 치환 또는 비치환된 탄소수 3 내지 30의 시클로알킬기, 치환 또는 비치환된 탄소수 5 내지 30의 시클로알케닐기, 치환 또는 비치환된 탄소수 1 내지 30의 알콕시기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴옥시기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬티옥시기, 치환 또는 비치환된 탄소수 5 내지 30의 아릴티옥시기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬아민기, 치환 또는 비치환된 탄소수 5 내지 30의 아릴아민기, 치환 또는 비치환된 탄소수 5 내지 50의 아릴기, 치환 또는 비치환된 탄소수 2 내지 50의 헤테로아릴기, 또는 이들의 조합이며,

Ar_1은 치환 또는 비치환된 탄소수 1 내지 30의 알킬기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬티옥시기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬아민기, 치환 또는 비치환된 탄소수 2 내지 30의 헤테로시클로알킬기, 치환 또는 비치환된 탄소수 2 내지 50의 헤테로아릴기, 치환 또는 비치환된 탄소수 6 내지 50의 아릴기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴옥시기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴티옥시기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴아민기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴실릴기, 또는 이들의 조합이며,

Ar_2는 수소, 치환 또는 비치환된 탄소수 1 내지 30의 알킬기, 치환 또는 비치환된 탄소수 2 내지 30의 알케닐기, 치환 또는 비치환된 탄소수 3 내지 30의 시클로알킬기, 치환 또는 비치환된 탄소수 5 내지 30의 시클로알케닐기, 치환 또는 비치환된 탄소수 1 내지 30의 알콕시기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴옥시기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬티옥시기, 치환 또는 비치환된 탄소수 5 내지 30의 아릴티옥시기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬아민기, 치환 또는 비치환된 탄소수 5 내지 30의 아릴아민기, 치환 또는 비치환된 탄소수 5 내지 50의 아릴기, 치환 또는 비치환된 탄소수 2 내지 50의 헤테로아릴기, 치환 또는 비치환된 실릴기, 치환 또는 비치환된 게르마늄기, 치환 또는 비치환된 붕소기, 치환 또는 비치환된 알루미늄기, 카르보닐기, 포스포릴기, 아미노기, 니트릴기, 히드록시기, 니트로기, 할로겐기, 셀레늄기, 텔루륨기, 아미드기 및 에스테르기, 또는 이들의 조합이다.

청구항 2

제1항에 있어서,

상기 화학식 1에서,

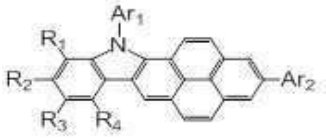
Ar_2는 치환 또는 비치환된 탄소수 1 내지 30의 알킬아민기, 치환 또는 비치환된 탄소수 5 내지 30의 아릴아민기, 치환 또는 비치환된 탄소수 5 내지 50의 아릴기, 치환 또는 비치환된 탄소수 2 내지 50의 헤테로아릴기, 또는 이들의 조합인, 유기전자소자용 화합물.

청구항 3

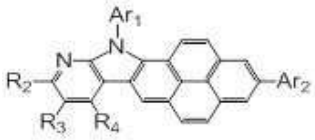
제1항에 있어서,

상기 화학식 1은 하기 화학식 2-1 내지 2-15 중 어느 하나로 표시되는, 유기전자소자용 화합물:

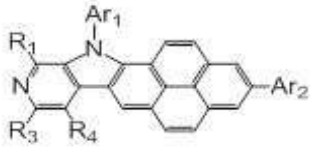
[화학식 2-1]



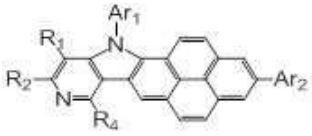
[화학식 2-2]



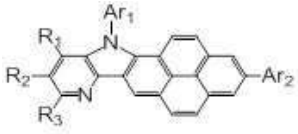
[화학식 2-3]



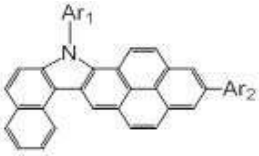
[화학식 2-4]



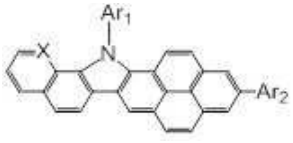
[화학식 2-5]



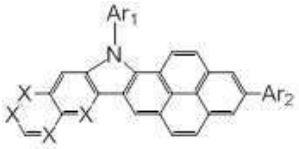
[화학식 2-6]



[화학식 2-7]

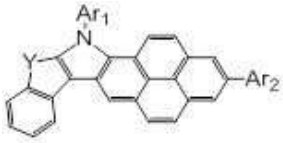


[화학식 2-8]

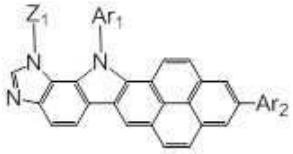


[화학식 2-9]

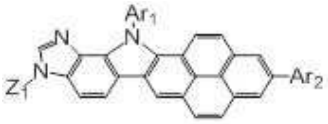
[화학식 2-10]



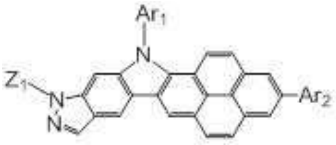
[화학식 2-11]



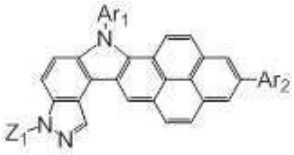
[화학식 2-12]



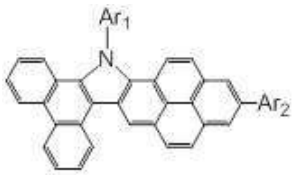
[화학식 2-13]



[화학식 2-14]



[화학식 2-15]



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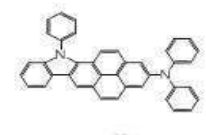
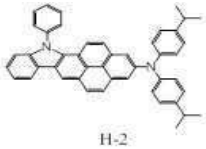
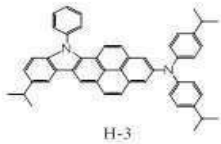
청구항 4

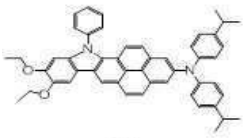
제1항에 있어서,

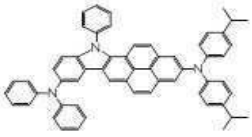
상기 유기전자소자용 화합물은 하기 화학식 중 어느 하나로 표시되는, 유기전자소자용 화합물:

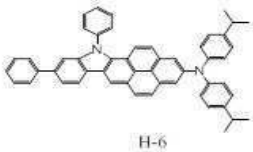

H-1

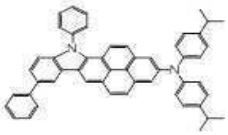

H-2

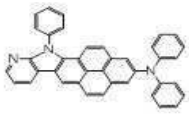

H-3


H-4

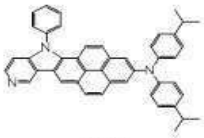

H-5

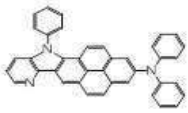

H-6

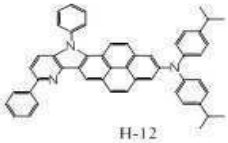

H-7

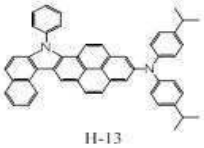

H-8

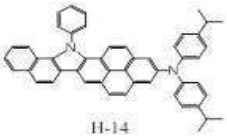

H-9

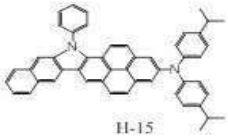

H-10

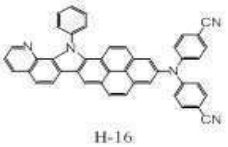

H-11


H-12


H-13


H-14


H-15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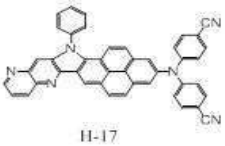
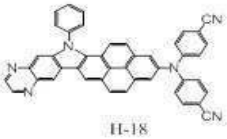
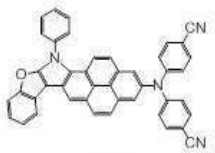
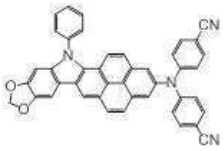

H-17


H-18


H-19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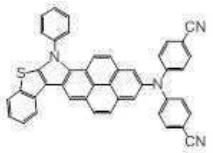
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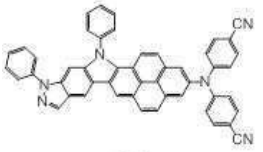
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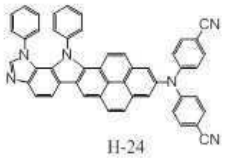
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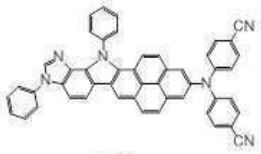
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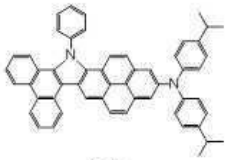
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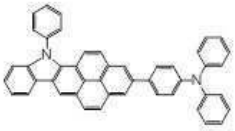
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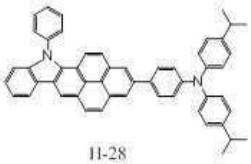
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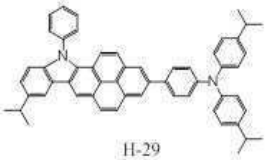
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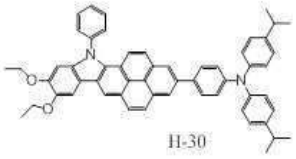
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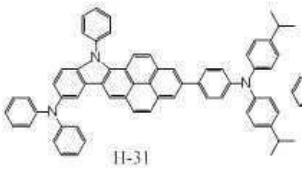
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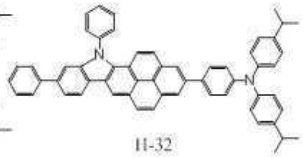
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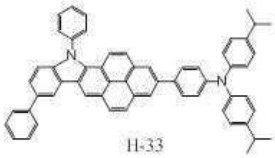
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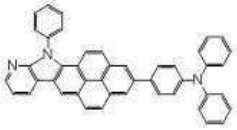
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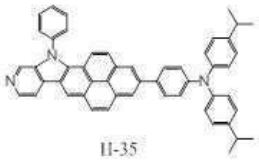
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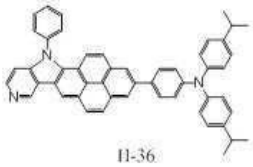
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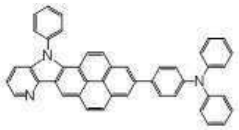

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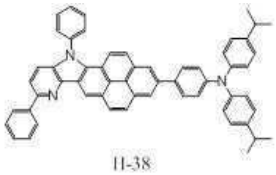

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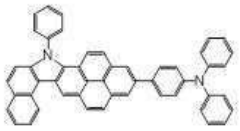

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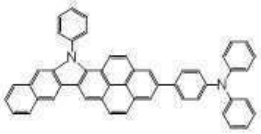

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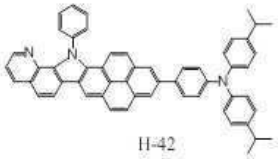

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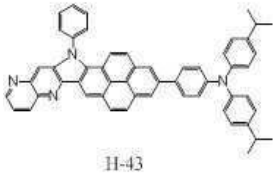

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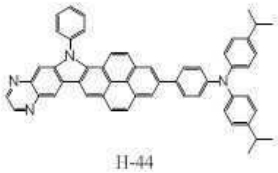

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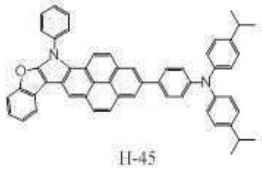

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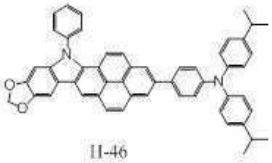

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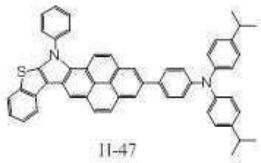

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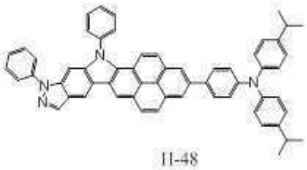

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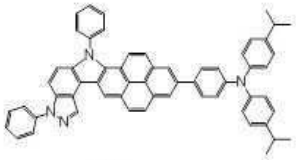

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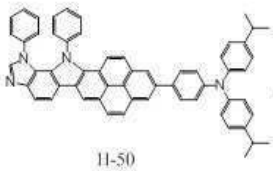

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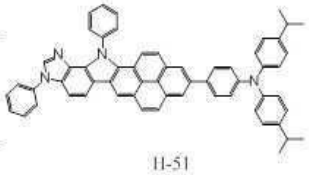

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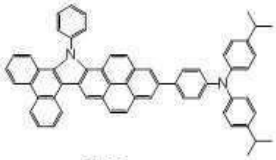

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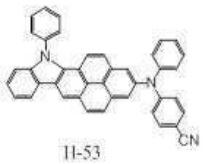

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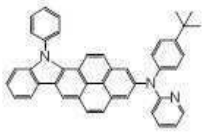

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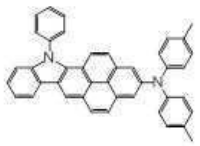

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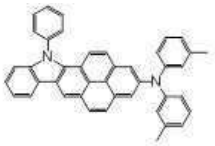

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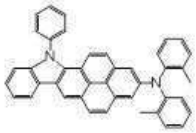

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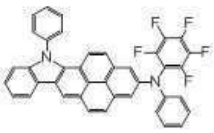

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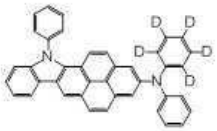

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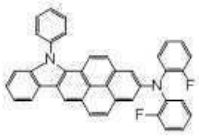

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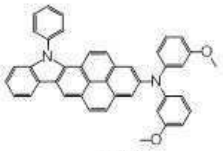

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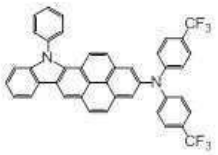

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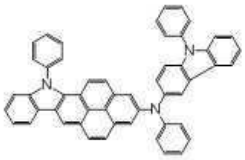

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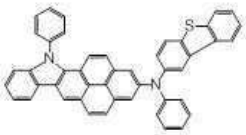

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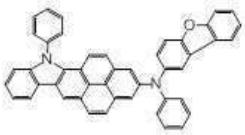

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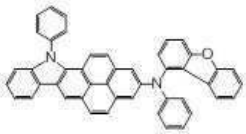

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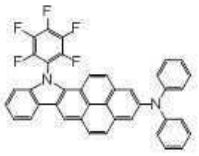

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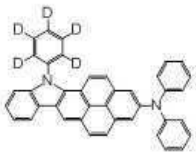

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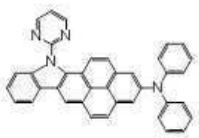


H-90

청구항 5

제1 전극, 제2 전극 및 상기 제1 전극과 상기 제2 전극 사이에 개재되는 하나 이상의 유기물층을 포함하는 유기전자소자에 있어서,

상기 유기물층 중 하나 이상은 상기 제1항 내지 제4항 중 어느 한 항에 따른 유기전자소자용 화합물을 포함하는, 유기전자소자.

청구항 6

제5항에 있어서,

상기 유기물층은 발광층, 정공수송층, 정공주입층, 전자수송층, 전자주입층, 정공차단층 및 이들의 조합으로 이루어진 군에서 선택된 어느 하나인, 유기전자소자.

청구항 7

제5항에 있어서,

상기 유기전자소자는,

유기광전소자, 유기발광소자, 유기태양전지, 유기트랜지스터, 유기 감광체, 전자종이 및 유기메모리소자로 이루어진 군에서 선택되는 어느 하나인, 유기전자소자.

청구항 8

제5항에 따른 유기전자소자를 포함하는 표시장치.

발명의 설명

기 술 분 야

[0001] 본 기재는 유기전자소자용 화합물, 이를 포함하는 유기전자소자 및 유기전자소자를 포함하는 표시장치에 관한 것이다.

배 경 기 술

[0002] 일반적으로 유기발광 다이오드(OLED: Organic Light Emitting Diodes)는 음극, 양극, 및 음극과 양극 사이에 개재된 유기물층으로 구성되어 있다. 소자의 구성을 전체적으로 보면 투명 ITO 양극, 정공주입층 (HIL), 정공전달층 (HTL), 발광층 (EL), 정공저지층 (HBL), 전자전달층 (ETL), 전자주입층 (EIL), LiAl 등의 음극으로 형성되며, 필요에 따라 유기물층의 1~2 개를 생략하는 경우도 있다. 구성된 양 전극 사이에 전계가 인가되면 음극 측으로부터 전자가 주입되고 양극 측으로부터 정공이 주입된다.

[0003] 또한, 이 전자가 발광층에 정공과 재결합하여 여기상태를 생성하고, 여기상태가 기저상태로 되돌아갈 때에 에너지를 빛으로서 방출한다. 이러한 발광 재료는 크게 형광과 인광으로 나뉘며, 발광층 형성방법은 형광 호스트(순수 유기물)에 인광(유기금속)을 도핑하는 방법과 형광 호스트에 형광 도판트(질소 등을 포함하는 유기물)를 도핑하는 방법 및 발광체에 도판트 (DCM, Rubrene, DCJTB 등)를 이용하여 장파장을 구현하는 방법 등이 있다. 이러한 도핑을 통해 발광 파장, 효율, 구동전압, 수명 등을 개선하려 하고 있다. 일반적으로 발광층 형성용 재료들은 벤젠, 나프탈렌, 플로렌, 스파이로플로렌, 안트라센, 파이렌, 카바졸 등의 중심체와 페닐, 바이페닐, 나프탈렌, 헤테로사이클 등의 리간드 그리고 오르소, 메타, 파라 등의 결합 위치 및 아민, 시안, 불소, 메틸, 트리메틸 등이 치환된 구조들을 갖는다.

[0004] 현재 디스플레이의 화면이 대형화 방향으로 진행되면서 고성능의 발광 재료들이 요구되고 있다. 또한 발광파장의 색 좌표 이외에, 소자의 낮은 구동전압에서 높은 발광효율 및 재료의 화학 구조적 열 안정성인 높은 유리전이온도에 대한 특성 향상이 요구되고 있다.

발명의 내용

해결하려는 과제

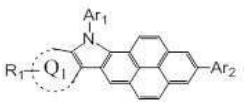
[0005] 본 기재는, 성능이 우수한 비대칭형 구조의 유기발광 성능 향상을 제공할 수 있는 유기전자소자용 화합물, 이를 포함하는 유기전자소자 및 유기전자소자를 포함하는 표시장치를 제공하고자 한다.

[0006] 또한, 본 발명이 해결하고자 하는 기술적 과제는 이상에서 언급한 기술적 과제로 제한되지 않으며, 언급되지 않은 또 다른 기술적 과제들은 아래의 기재로부터 본 발명이 속하는 기술분야에서 통상의 지식을 가진 자에게 명확하게 이해될 수 있을 것이다.

과제의 해결 수단

[0007] 본 발명의 구현예에 따른 유기전자소자용 화합물은 하기 화학식 1로 표시된다.

[0008] [화학식 1]

[0009] 

[0010] Q_1은 치환 또는 비치환된 탄소수 6 내지 30의 방향족 탄화수소 고리 또는 치환 또는 비치환된 탄소수 5 내지 30의 방향족 헤테로 고리이고;

[0011] R_1은 수소, 치환 또는 비치환된 탄소수 1 내지 30의 알킬기, 치환 또는 비치환된 탄소수 2 내지 30의 알케닐기, 치환 또는 비치환된 탄소수 3 내지 30의 시클로알킬기, 치환 또는 비치환된 탄소수 5 내지 30의 시클로알케닐기, 치환 또는 비치환된 탄소수 1 내지 30의 알콕시기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴옥시기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬티옥시기, 치환 또는 비치환된 탄소수 5 내지 30의 아릴티옥시기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬아민기, 치환 또는 비치환된 탄소수 5 내지 30의 아릴아민기, 치환 또는 비치환된 탄소수 5 내지 50의 아릴기, 치환 또는 비치환된 탄소수 2 내지 50의 헤테로아릴기, 또는 이들의 조합이며,

[0012] Ar_1은 치환 또는 비치환된 탄소수 1 내지 30의 알킬기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬티옥시기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬아민기, 치환 또는 비치환된 탄소수 2 내지 30의 헤테로시클로알킬기, 치환 또는 비치환된 탄소수 2 내지 50의 헤테로아릴기, 치환 또는 비치환된 탄소수 6 내지 50의 아릴기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴옥시기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴티옥시기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴아민기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴실릴기, 또는 이들의 조합이며,

[0013] Ar_2는 수소, 치환 또는 비치환된 탄소수 1 내지 30의 알킬기, 치환 또는 비치환된 탄소수 2 내지 30의 알케닐기, 치환 또는 비치환된 탄소수 3 내지 30의 시클로알킬기, 치환 또는 비치환된 탄소수 5 내지 30의 시클로알케닐기, 치환 또는 비치환된 탄소수 1 내지 30의 알콕시기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴옥시기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬티옥시기, 치환 또는 비치환된 탄소수 5 내지 30의 아릴티옥시기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬아민기, 치환 또는 비치환된 탄소수 5 내지 30의 아릴아민기, 치환 또는 비치환된 탄소수 5 내지 50의 아릴기, 치환 또는 비치환된 탄소수 2 내지 50의 헤테로아릴기, 치환 또는 비치환된 실릴기, 치환 또는 비치환된 게르마늄기, 치환 또는 비치환된 붕소기, 치환 또는 비치환된 알루미늄기, 카르보닐기, 포스포릴기, 아미노기, 니트릴기, 히드록시기, 니트로기, 할로겐기, 셀레늄기, 텔루륨기, 아미드기 및 에스테르기, 또는 이들의 조합이다.

[0014] 본 발명의 다른 구현예에 따른 유기전자소자는, 제1 전극, 제2 전극 및 상기 제1 전극과 상기 제2 전극 사이에 개재되는 하나 이상의 유기물층을 포함하며, 상기 유기물층 중 하나 이상은 전술한 유기전자소자용 화합물을 포함한다.

[0015] 본 발명의 또 다른 구현예에 따른 표시장치는 전술한 유기전자소자를 포함한다.

발명의 효과

[0016] 본 기재에 의하면, 비대칭형 구조의 구조를 제공하여 성능이 우수한 유기전자소자용 화합물, 이를 포함하는 유기전자소자 및 유기전자소자를 포함하는 표시장치를 제공할 수 있다.

발명을 실시하기 위한 구체적인 내용

[0017] 이하, 첨부된 도면을 참조하여 본 발명의 실시예들을 상세하게 설명하면 다음과 같다. 다만, 본 기재를 설명함에 있어서, 이미 공지된 기능 혹은 구성에 대한 설명은, 본 기재의 요지를 명료하게 하기 위하여 생략하기로 한다.

[0018] 본 명세서에서 "치환"이란 별도의 정의가 없는 한, 치환기 또는 화합물 중의 적어도 하나의 수소가 중수소, 할로겐기, 히드록시기, 아미노기, 치환 또는 비치환된 아민기, 니트로기, 치환 또는 비치환된 실릴기, 탄소수 1 내지 30의 알킬기, 탄소수 1 내지 10의 알킬실릴기, 탄소수 3 내지 30의 시클로알킬기, 탄소수 6 내지 30의 아릴기, 탄소수 1 내지 20의 알콕시기, 플루오로기, 트리플루오로메틸기 등의 탄소수 1 내지 10의 트리플루오로알킬기 또는 시아노기로 치환된 것을 의미한다.

[0019] 또한 상기 치환된 할로겐기, 히드록시기, 아미노기, 치환 또는 비치환된 아민기, 니트로기, 치환 또는 비치환된 실릴기, 탄소수 1 내지 30의 알킬기, 탄소수 1 내지 10의 알킬실릴기, 탄소수 3 내지 30의 시클로알킬기, 탄소수 6 내지 30의 아릴기, 탄소수 1 내지 20의 알콕시기, 플루오로기, 트리플루오로메틸기 등의 탄소수 1 내지 10의 트리플루오로알킬기 또는 시아노기 중 인접한 두 개의 치환기가 융합되어 고리를 형성할 수도 있다.

[0020] 본 명세서에서 "헤테로"란 별도의 정의가 없는 한, 하나의 작용기 내에 N, O, S 및 P로 이루어진 군에서 선택되는 헤테로 원자를 1 내지 3개 함유하고, 나머지는 탄소인 것을 의미한다.

[0021] 본 명세서에서 "이들의 조합"이란 별도의 정의가 없는 한, 둘 이상의 치환기가 연결기로 결합되어 있거나, 둘 이상의 치환기가 축합하여 결합되어 있는 것을 의미한다.

[0022] 본 명세서에서 "알킬(alkyl)기"이란 별도의 정의가 없는 한, 지방족 탄화수소기를 의미한다. 알킬기는 어떠한 이중결합이나 삼중결합을 포함하고 있지 않은 "포화 알킬(saturated alkyl)기"일 수 있다.

[0023] 알킬기는 탄소수 1 내지 20인 알킬기일 수 있다. 보다 구체적으로 알킬기는 탄소수 1 내지 10인 알킬기 또는 탄소수 1 내지 6인 알킬기일 수도 있다. 예를 들어, 탄소수 1 내지 4인 알킬기는 알킬쇄에 1 내지 4 개의 탄소원자가 포함되는 것을 의미하며, 메틸, 에틸, 프로필, 이소-프로필, n-부틸, 이소-부틸, sec-부틸 및 t-부틸로 이루어진 군에서 선택됨을 나타낸다.

[0024] 상기 알킬기는 구체적인 예를 들어 메틸기, 에틸기, 프로필기, 이소프로필기, 부틸기, 이소부틸기, t-부틸기, 펜틸기, 헥실기, 시클로프로필기, 시클로부틸기, 시클로펜틸기, 시클로헥실기 등을 의미한다.

[0025] "아릴(aryl)기"는 환형인 치환기의 모든 원소가 p-오비탈을 가지고 있으며, 이들 p-오비탈이 공액(conjugation)을 형성하고 있는 치환기를 의미하하고, 모노시클릭 또는 융합 고리 폴리시클릭(즉, 탄소원자들의 인접한 쌍들을 나눠 가지는 고리) 작용기를 포함한다.

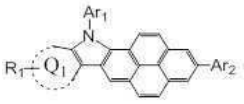
[0026] "헤테로아릴(heteroaryl)기"는 아릴기 내에 N, O, S 및 P로 이루어진 군에서 선택되는 헤테로 원자를 1 내지 3개 함유하고, 나머지는 탄소인 것을 의미한다. 상기 헤테로아릴기가 융합고리인 경우, 각각의 고리마다 상기 헤테로 원자를 1 내지 3개 포함할 수 있다.

[0027] 본 명세서에서, 정공 특성이란, HOMO 준위를 따라 전도 특성을 가져 양극에서 형성된 정공의 발광층으로의 주입 및 발광층에서의 이동을 용이하게 하는 특성을 의미한다. 보다 구체적으로, 전자를 밀어내는 특성과도 유사할 수 있다.

[0028] 또한 전자 특성이란, LUMO 준위를 따라 전도 특성을 가져 음극에서 형성된 전자의 발광층으로의 주입 및 발광층에서의 이동을 용이하게 하는 특성을 의미한다. 보다 구체적으로 전자를 당기는 특성과도 유사할 수 있다.

[0029] 본 발명의 일 구현예에 따라, 하기 화학식 1로 표시되는 유기전자소자용 화합물이 제공된다.

[0030] [화학식 1]

[0031] 

[0032] Q_1은 치환 또는 비치환된 탄소수 6 내지 30의 방향족 탄화수소 고리 또는 치환 또는 비치환된 탄소수 5 내지 30의 방향족 헤테로 고리이고;

[0033] R_1은 수소, 치환 또는 비치환된 탄소수 1 내지 30의 알킬기, 치환 또는 비치환된 탄소수 2 내지 30의 알케닐기, 치환 또는 비치환된 탄소수 3 내지 30의 시클로알킬기, 치환 또는 비치환된 탄소수 5 내지 30의 시클로알케닐기, 치환 또는 비치환된 탄소수 1 내지 30의 알콕시기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴옥시기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬티옥시기, 치환 또는 비치환된 탄소수 5 내지 30의 아릴티옥시기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬아민기, 치환 또는 비치환된 탄소수 5 내지 30의 아릴아민기, 치환 또는 비치환된 탄소수 5 내지 50의 아릴기, 치환 또는 비치환된 탄소수 2 내지 50의 헤테로아릴기, 또는 이들의 조합이며,

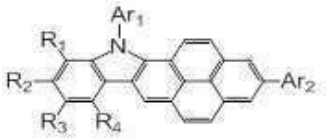
[0034] Ar_1은 치환 또는 비치환된 탄소수 1 내지 30의 알킬기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬티옥시기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬아민기, 치환 또는 비치환된 탄소수 2 내지 30의 헤테로시클로알킬기, 치환 또는 비치환된 탄소수 2 내지 50의 헤테로아릴기, 치환 또는 비치환된 탄소수 6 내지 50의 아릴기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴옥시기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴티옥시기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴아민기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴실릴기, 또는 이들의 조합이며,

[0035] Ar_2는 수소, 치환 또는 비치환된 탄소수 1 내지 30의 알킬기, 치환 또는 비치환된 탄소수 2 내지 30의 알케닐기, 치환 또는 비치환된 탄소수 3 내지 30의 시클로알킬기, 치환 또는 비치환된 탄소수 5 내지 30의 시클로알케닐기, 치환 또는 비치환된 탄소수 1 내지 30의 알콕시기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴옥시기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬티옥시기, 치환 또는 비치환된 탄소수 5 내지 30의 아릴티옥시기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬아민기, 치환 또는 비치환된 탄소수 5 내지 30의 아릴아민기, 치환 또는 비치환된 탄소수 5 내지 50의 아릴기, 치환 또는 비치환된 탄소수 2 내지 50의 헤테로아릴기, 치환 또는 비치환된 실릴기, 치환 또는 비치환된 게르마늄기, 치환 또는 비치환된 붕소기, 치환 또는 비치환된 알루미늄기, 카르보닐기, 포스포릴기, 아미노기, 니트릴기, 히드록시기, 니트로기, 할로겐기, 셀레늄기, 텔루륨기, 아미드기 및 에스테르기, 또는 이들의 조합이다.

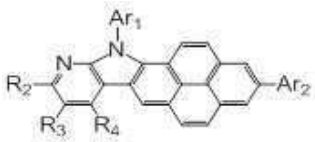
[0036] 일 예로, 상기 화학식 1에서, Ar_2는 치환 또는 비치환된 탄소수 1 내지 30의 알킬아민기, 치환 또는 비치환된 탄소수 5 내지 30의 아릴아민기, 치환 또는 비치환된 탄소수 5 내지 50의 아릴기, 치환 또는 비치환된 탄소수 2 내지 50의 헤테로아릴기, 또는 이들의 조합일 수 있다.

[0037] 상기 화학식 1은 하기 화학식 2-1 내지 2-15중 어느 하나로 표시될 수 있다.

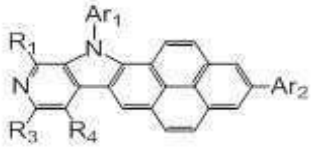
[0038] [화학식 2-1]

[0039] 

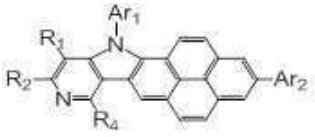
[0040] [화학식 2-2]

[0041] 

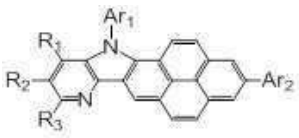
[0042] [화학식 2-3]

[0043] 

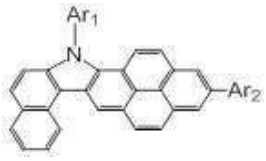
[0044] [화학식 2-4]

[0045] 

[0046] [화학식 2-5]

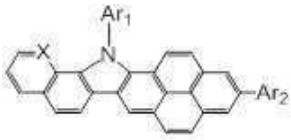
[0047] 

[0048] [화학식 2-6]



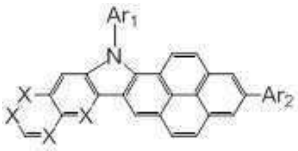
[0049]

[0050] [화학식 2-7]



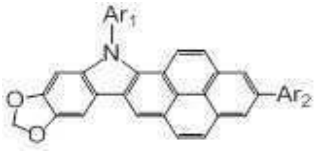
[0051]

[0052] [화학식 2-8]



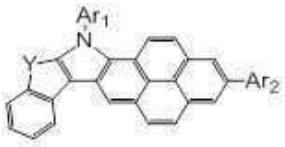
[0053]

[0054] [화학식 2-9]



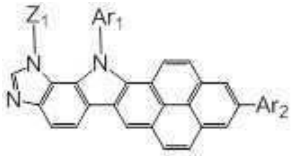
[0055]

[0056] [화학식 2-10]



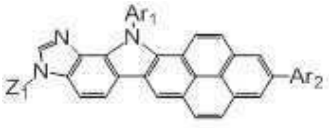
[0057]

[0058] [화학식 2-11]



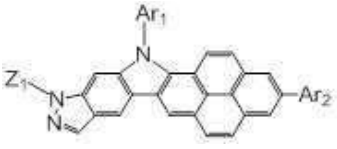
[0059]

[0060] [화학식 2-12]



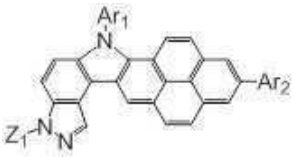
[0061]

[0062] [화학식 2-13]



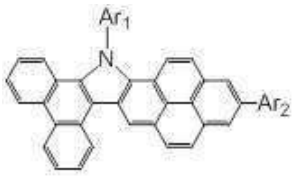
[0063]

[0064] [화학식 2-14]



[0065]

[0066] [화학식 2-15]



[0067]

[0068] 상기 화학식 2-1 내지 화학식 2-15에서,

[0069] Ar_1은 치환 또는 비치환된 탄소수 1 내지 30의 알킬기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬티옥시기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬아민기, 치환 또는 비치환된 탄소수 2 내지 30의 헤테로시클로알킬기, 치환 또는 비치환된 탄소수 2 내지 50의 헤테로아릴기, 치환 또는 비치환된 탄소수 6 내지 50의 아릴기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴옥시기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴티옥시기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴아민기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴실릴기, 또는 이들의 조합이며,

[0070] Ar_2는 수소, 치환 또는 비치환된 탄소수 1 내지 30의 알킬기, 치환 또는 비치환된 탄소수 2 내지 30의 알케닐기, 치환 또는 비치환된 탄소수 3 내지 30의 시클로알킬기, 치환 또는 비치환된 탄소수 5 내지 30의 시클로알케닐기, 치환 또는 비치환된 탄소수 1 내지 30의 알콕시기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴옥시기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬티옥시기, 치환 또는 비치환된 탄소수 5 내지 30의 아릴티옥시기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬아민기, 치환 또는 비치환된 탄소수 5 내지 30의 아릴아민기, 치환 또는 비치환된 탄소수 5 내지 50의 아릴기, 치환 또는 비치환된 탄소수 2 내지 50의 헤테로아릴기, 치환 또는 비치환된 실릴기, 치환 또는 비치환된 게르마늄기, 치환 또는 비치환된 붕소기, 치환 또는 비치환된 알루미늄기, 카르보닐기, 포스포릴기, 아미노기, 니트릴기, 히드록시기, 니트로기, 할로겐기, 셀레늄기, 텔루륨기, 아미드기 및 에스테르기, 또는 이들의 조합이며,

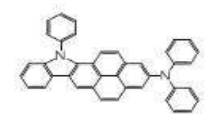
[0071] X는 각각 독립적으로, $C\text{-}R_5$ 또는 질소(N)이며,

[0072] Y는 산소(O) 또는 황(S)이며,

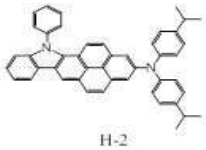
[0073] R_1 내지 R_5는 각각 독립적으로, 수소, 치환 또는 비치환된 탄소수 1 내지 30의 알킬기, 치환 또는 비치환된 탄소수 2 내지 30의 알케닐기, 치환 또는 비치환된 탄소수 3 내지 30의 시클로알킬기, 치환 또는 비치환된 탄소수 5 내지 30의 시클로알케닐기, 치환 또는 비치환된 탄소수 1 내지 30의 알콕시기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴옥시기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬티옥시기, 치환 또는 비치환된 탄소수 5 내지 30의 아릴티옥시기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬아민기, 치환 또는 비치환된 탄소수 5 내지 30의 아릴아민기, 치환 또는 비치환된 탄소수 5 내지 50의 아릴기, 치환 또는 비치환된 탄소수 2 내지 50의 헤테로아릴기, 또는 이들의 조합이며,

[0074] Z_1은 치환 또는 비치환된 탄소수 1 내지 30의 알킬기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬티옥시기, 치환 또는 비치환된 탄소수 1 내지 30의 알킬아민기, 치환 또는 비치환된 탄소수 2 내지 30의 헤테로시클로알킬기, 치환 또는 비치환된 탄소수 2 내지 50의 헤테로아릴기, 치환 또는 비치환된 탄소수 6 내지 50의 아릴기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴옥시기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴티옥시기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴아민기, 치환 또는 비치환된 탄소수 6 내지 30의 아릴실릴기, 또는 이들의 조합이다.

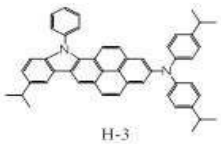
[0075] 상기 화학식 1에 따른 유기전자소자용 화합물은 하기 화학식 중 어느 하나로 표시될 수 있다.



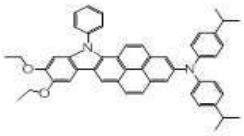
H-1



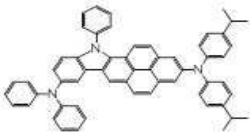
H-2



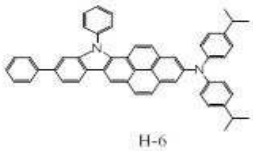
H-3



H-4



H-5



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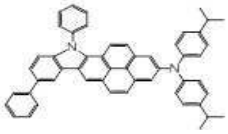

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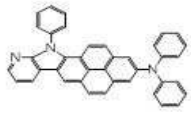

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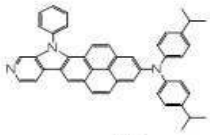

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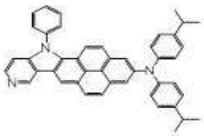

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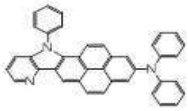

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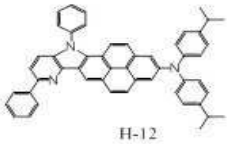

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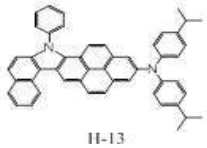

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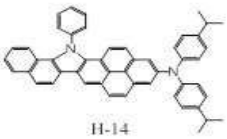

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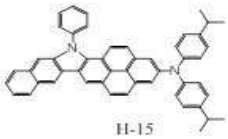

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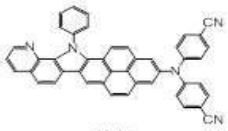

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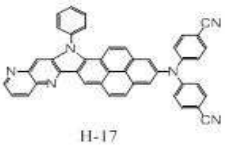

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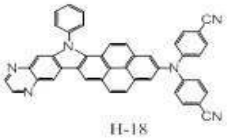

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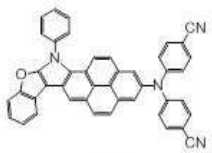
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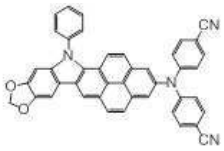
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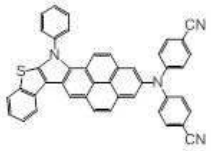
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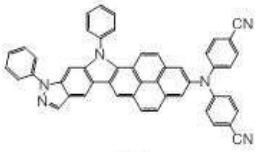
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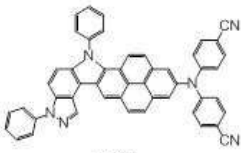
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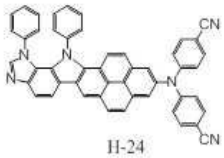
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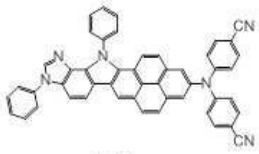
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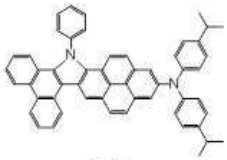
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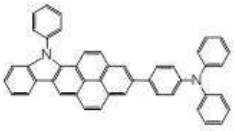
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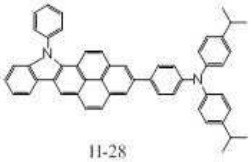
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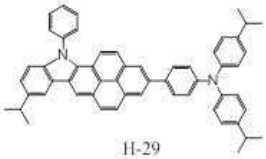
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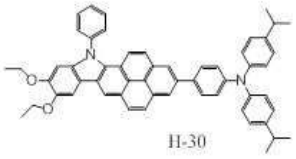
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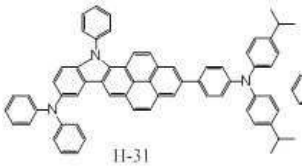
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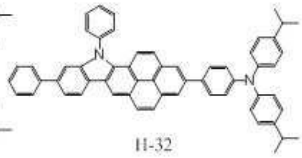
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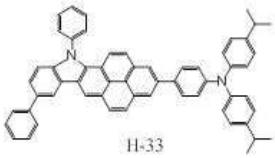
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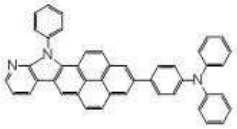
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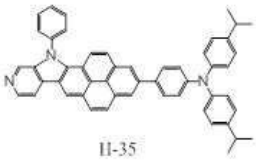
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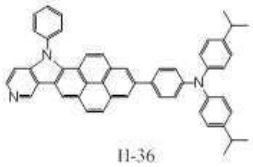
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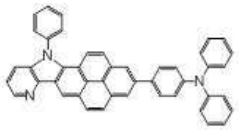

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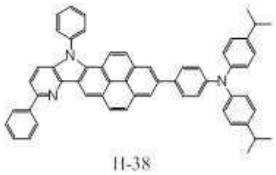

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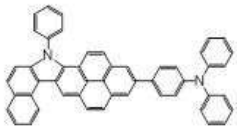

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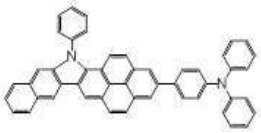

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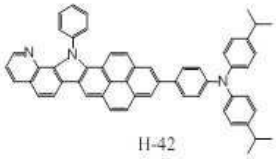

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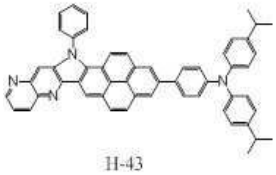

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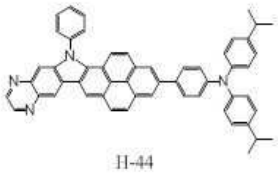

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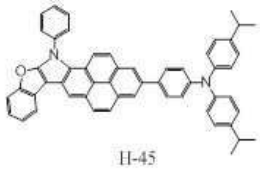

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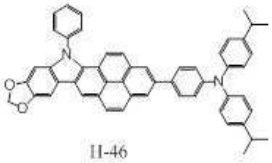

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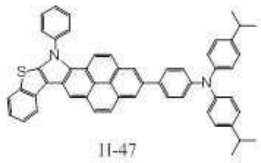

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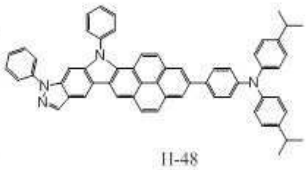

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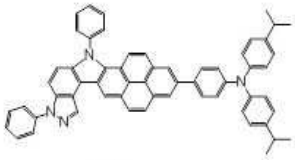

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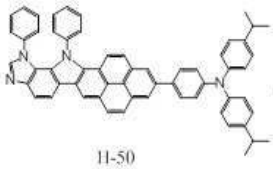

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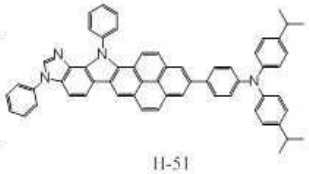

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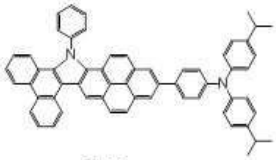

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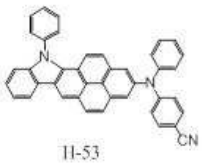

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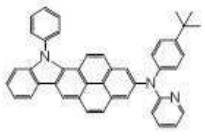

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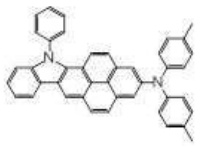

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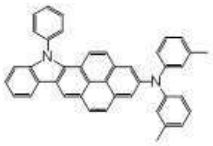

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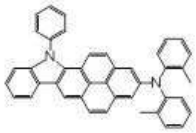

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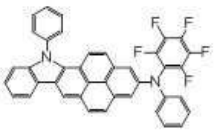

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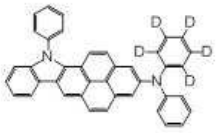

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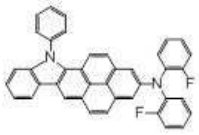

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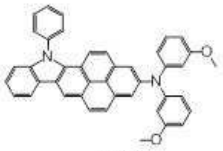

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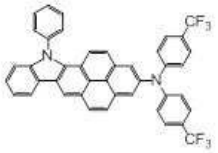

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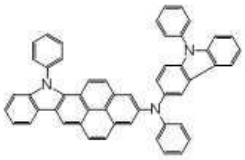

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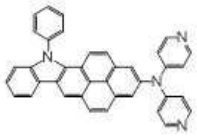

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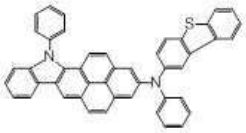
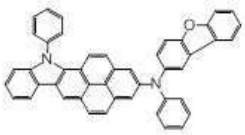
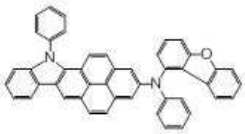


H-84

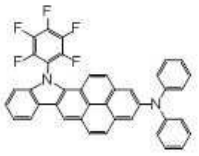


H-85

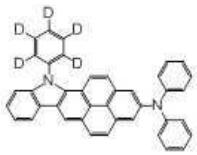
H-86



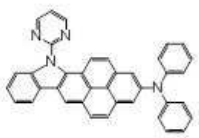
H-87



H-88



H-89



H-90

[0079]

[0080] 본 발명의 다른 일 구현예에 따르면, 제1 전극, 제2 전극 및 상기 제1 전극 및 상기 제2 전극 사이에 개재되는 하나 이상의 유기물층을 포함하는 유기전자소자로서, 상기 유기물층 중 하나 이상은 전술한 상기 화학식 1의 유기전자소자용 화합물을 포함하는 유기전자소자가 제공된다.

[0081] 상기 유기전자소자용 화합물은 단일 물질 또는 서로 다른 물질의 혼합물의 형태로 상기 유기물층에 포함될 수 있다.

[0082] 본 명세서 중 "유기물층"은 유기전자소자 중 제1전극과 제2전극 사이에 개재된 모든 층을 가리키는 용어이다. 상기 유기물층은 정공 특성을 가지는 층 및 전자 특성을 가지는 층일 수 있다. 예를 들어, 상기 유기물층은 정공 주입층, 정공 수송층, 정공 주입 기능 및 정공 수송 기능을 동시에 갖는 기능층, 전자 저지층, 발광층, 정공 저지층, 전자 수송층, 전자 주입층 및 전자 수송 기능 및 전자 주입 기능을 동시에 갖는 기능층 중 하나 이상을 포함할 수 있다.

[0083] 상기 정공 주입층, 상기 정공 수송층 및 상기 정공 주입 기능 및 정공 수송 기능을 동시에 갖는 기능층 중 적어도 하나는, 통상의 정공 주입 물질, 정공 수송 물질 및 정공 주입 및 수송 기능을 동시에 하는 물질 외에, 전하

-생성 물질을 더 포함할 수 있다.

[0084] 예를 들어, 상기 유기물층은 발광층을 포함하고, 상기 발광층은 인광 호스트, 형광 호스트, 인광 도판트 및 형광 도판트 중 하나 이상을 포함할 수 있다. 여기서, 상기 발광층에 상기 유기전자소자용 화합물이 포함되어 있고, i) 상기 형광 호스트가 상기 유기전자소자용 화합물이거나, ii) 상기 형광 도판트가 상기 유기전자소자용 화합물이거나, iii) 상기 형광 호스트 및 형광 도판트 각각이 상기 유기전자소자용 화합물일 수 있다.

[0085] 상기 발광층은 적색, 녹색 또는 청색 발광층일 수 있다. 예를 들어, 상기 발광층은 청색 발광층일 수 있다. 이때, 상기 유기전자소자용 화합물은 청색 호스트 및/또는 청색 도펀트로 사용되어, 고효율, 고휘도, 고색순도, 및 장수명을 갖는 유기전자소자를 제공할 수 있다.

[0086] 또한, 상기 유기물층은 전자 수송층을 포함하고, 상기 전자 수송층에 상기 유기전자소자용 화합물이 포함될 수 있다. 여기서, 상기 전자 수송층은 상기 유기전자소자용 화합물 외에, 금속-함유 화합물을 더 포함할 수 있다.

[0087] 상기 유기물층은 발광층 및 전자 수송층을 모두 포함하고, 상기 발광층 및 전자 수송층 각각에 상기 유기전자소자용 화합물(발광층 및 전자 수송층에 포함된 상기 유기전자소자용 화합물은 서로 동일하거나 상이할 수 있음)가 포함되어 있을 수 있다.

[0088] 상기 유기전자소자는 화학식 1의 유기전자소자용 화합물을 이용하는 것을 제외하고는, 통상의 유기전자소자의 제조방법 및 재료에 의하여 제조될 수 있다.

[0089] 상기 유기전자소자는 유기광전소자, 유기발광소자 (OLED), 유기태양전지 (OSC), 전자종이 (e-Paper), 유기감광체(OPC), 유기트랜지스터 (OTFT) 및 유기메모리소자 중 어느 하나일 수 있다.

[0090] 일 예로, 상기 유기발광소자는 스퍼터링(sputtering)이나 전자빔 증발(e-beam evaporation)과 같은 PVD(physical vapor deposition) 방법을 이용하여, 기판 상에 금속 또는 전도성을 가지는 금속 산화물 또는 이들의 합금을 증착시켜 양극을 형성하고, 그 위에 정공주입층, 정공전달층, 발광층, 정공저지층 및 전자전달층을 포함하는 유기물층을 형성한 후, 그 위에 음극으로 사용할 수 있는 물질을 증착시킴으로써 제조될 수 있다. 이와 같은 방법 외에도, 기판 상에 음극 물질부터 유기물층, 양극 물질을 차례로 증착시켜 유기발광소자를 만들 수도 있다. 상기 유기물층은 정공주입층, 정공전달층, 발광층, 정공저지층 및 전자전달층 등을 포함하는 다층 구조일 수도 있다. 또한, 상기 유기물층은 다양한 고분자 소재를 사용하여 증착법이 아닌 용매 공정(solvent process), 예컨대 스핀 코팅, 딥 코팅, 닥터 블레이딩, 스크린 프린팅, 잉크젯 프린팅 또는 열전사법 등의 방법에 의하여 더 적은 수의 층으로 제조할 수 있다.

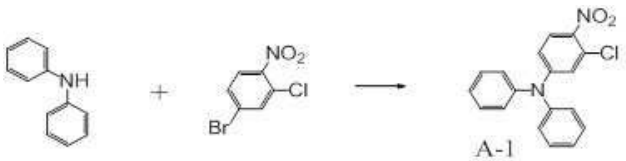
[0091] 일 구현예에 따른 유기발광소자는 사용되는 재료에 따라 전면 발광형, 후면 발광형 또는 양면 발광형일 수 있다. 일 구현예에 따른 유기전자소자용 화합물은 유기태양전지, 조명용 OLED, Flexible OLED, 유기감광체, 유기트랜지스터 등을 비롯한 유기전자소자에서도 유기발광소자에 적용되는 것과 유사한 원리로 작용할 수 있다.

[0092] 이하, 본 발명의 이해를 돕기 위하여 바람직한 실시예를 제시한다. 그러나 하기의 실시예는 본 발명을 보다 쉽게 이해하기 위하여 제공되는 것일 뿐, 이에 의해 본 발명의 내용이 한정되는 것은 아니다.

[0093] 또한, 본 발명의 각 실시예에서 제조방법이 구체적으로 개시되지 않은 화합물은 당업계에 통상적인 방법으로 제조하거나 또는 다른 실시예에 기재된 제조방법을 참고하여 제조함을 이해한다.

[0095] **<중간체의 제조>**

[0096] * 중간체 3-chloro-4-nitro-N,N-diphenylaniline (A-1)의 제조



A-1

[0097]

[0098] 디페닐아민 (Diphenylamine) 31.6g (187 mmol), 4-브로모-2-클로로-1-나이트로벤젠(4-bromo-2-chloro-1-nitrobenzene) 43.2 g (183 mmol), Pd(C2H3O2)2 0.4g(1.83 mmol), Pt-Bu3 (0.37g,1.83 mmol) 그리고 NaOt-Bu 22.8 g (238 mmol) 톨루엔 1000 ml 에 녹인 후 80 ℃ 에서 4 시간 동안 교반하였다. 반응액을 상온으로 식힌 후, 물 300 mL 와 디에틸에테르 300 mL로 3번 추출하였다. 모아진 유기층을 마그네슘설페이트로 건조하고 용매

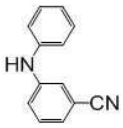
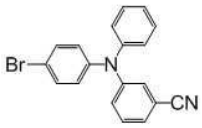
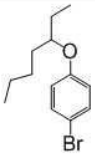
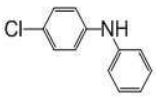
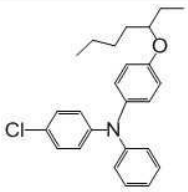
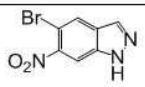
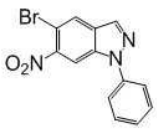
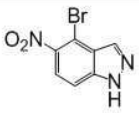
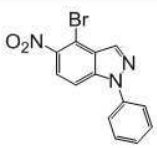
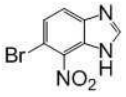
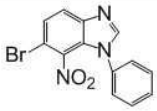
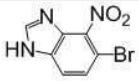
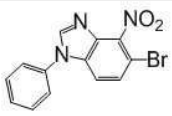
를 증발하여 얻어진 잔류물을 실리카젤관 크로마토그래피로 분리 정제하여 중간체 A-1 47.5 g (수율 80%)을 얻었다. 생성된 화합물은 LC-MS를 통해 확인하였다.

[0099] 질량스펙트럼 m/z: 324.76 (계산치 324.07)

[0101] * 중간체 A-2 내지 A-7의 제조

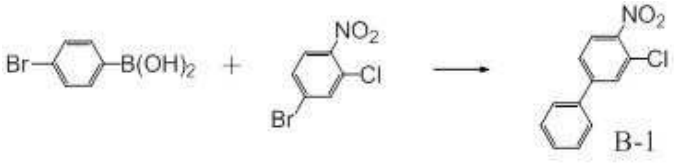
[0102] 상기 중간체 A-1의 제조 방법으로 하기 [표 1]의 화합물을 얻었다.

표 1

	반응물질		생성물질	수율
A-2				72
A-3				76
A-4				52
A-5				54
A-6				51
A-7				56

[0103]

[0105] * 중간체 3-chloro-4-nitro-1,1'-biphenyl (B-1)의 제조



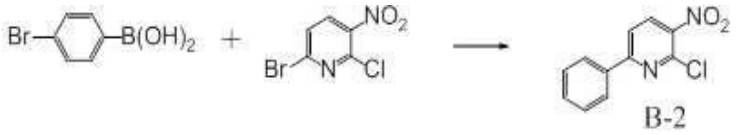
[0106]

[0107] (4-브로모페닐)브로산 ((4-bromophenyl)boronic acid) 36.7 g (183mmol), 4-브로모-2-클로로-1-나이트로벤젠 (4-bromo-2-chloro-1-nitrobenzene) 43.3g (183mmol), Pd(PPh3)4 2.1 g (1.83 mmol) 그리고 K2CO3 75.7 g (549 mmol) 을 THF/H2O (2/1) 혼합용액 60ml 에 녹인 후, 70 ℃에서 5시간 동안 교반하였다. 반응액을 실온으로 식힌 후 물 40 mL를 가하고 에틸에테르 50 mL로 3번 추출하였다. 모아진 유기층을 마그네슘설페이트로 건조

하고 용매를 증발하여 얻어진 잔류물을 실리카겔관 크로마토그래피로 분리 정제하여 B-1 29.9 g (수율 70 %)을 얻었다. 생성된 화합물은 LC-MS를 통해 확인하였다.

[0108] 질량 스펙트럼 m/z: 233.65 (계산치 233.02)

[0110] * 중간체 2-chloro-3-nitro-6-phenylpyridine (B-2)의 제조



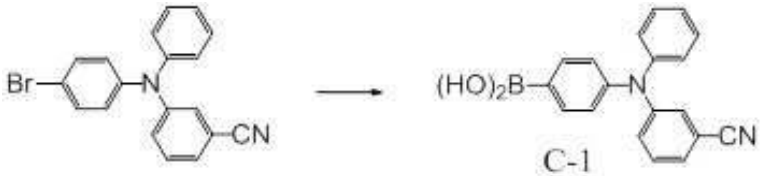
B-2

[0111]

[0112] (4-브로모페닐)브로산 ((4-bromophenyl)boronic acid) 36.7 g (183 mmol), 6-브로모-2-클로로-3-나이트로피리딘 (6-bromo-2-chloro-3-nitropyridine) 43.5g (183mmol), Pd(PPh3)4 2.1g (1.83 mmol) 그리고 K2CO3 75.7 g (549 mmol) 을 THF/H2O (2/1) 혼합용액 500ml 에 녹인 후, 70 ℃에서 5시간 동안 교반하였다. 반응액을 실온으로 식힌 후 물 40 mL를 가하고 에틸에테르 50 mL로 3번 추출하였다. 모아진 유기층을 마그네슘설페이트로 건조하고 용매를 증발하여 얻어진 잔류물을 실리카겔관 크로마토그래피로 분리 정제하여 B-2 27.9 g (수율 65 %)을 얻었다. 생성된 화합물은 LC-MS를 통해 확인하였다.

[0113] 질량 스펙트럼 m/z: 234.64 (계산치 234.02)

[0115] * 중간체 (4-((3-cyanophenyl)(phenyl)amino)phenyl)boronic acid (C-1)의 제조



C-1

[0116]

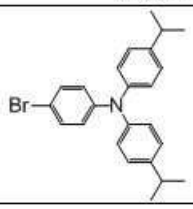
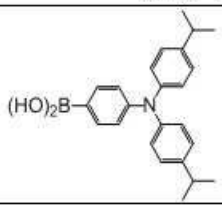
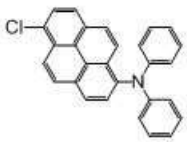
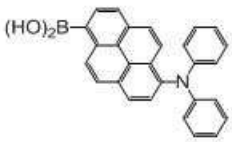
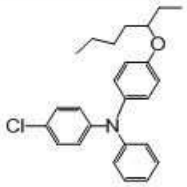
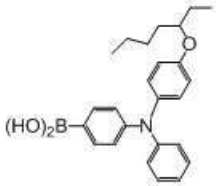
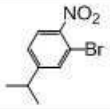
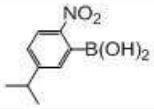
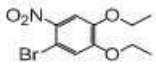
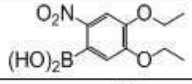
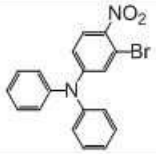
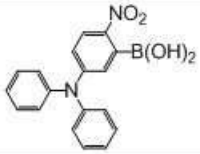
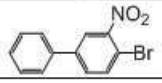
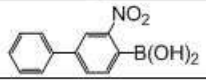
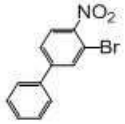
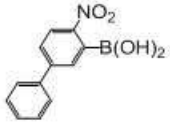
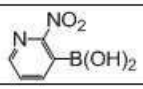
[0117] 반응기에 3-((4-브로모페닐)(페닐)아미노)벤조나이트릴 (3-((4-bromophenyl)(phenyl)amino)benzonitrile) 14.8g과 테트라하이드로푸란 200mL를 넣어 녹이고 -76℃로 냉각한 후 2.5M n-부틸리튬 21mL를 천천히 적가하고 30분 동안 교반하였다. 트리이소프로필보레이트 14g을 적가하고 실온에서 18시간 교반한 후, 1N 염산 수용액 300mL을 첨가하고 1시간 교반한 다음 반응을 종료하였다. 에틸아세테이트 500mL와 소금물 500mL로 추출 후 유기층은 무수 황산마그네슘 20g으로 탈수하고 감압 농축하였다. 고체는 여과하고 톨루엔 헥산 혼합용매로 씻어주어 C-1 10.6g (수율 80%)을 얻었다.

[0118] 질량 스펙트럼 m/z: 314.15 (계산치 314.12)

[0120] * 중간체 C-2 내지 C-37의 제조

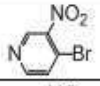
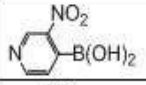
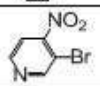
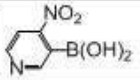
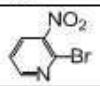
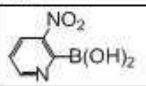
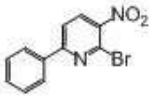
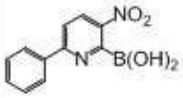
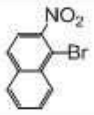
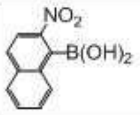
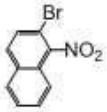
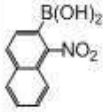
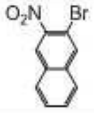
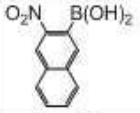
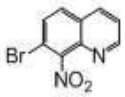
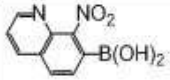
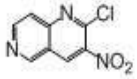
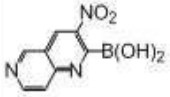
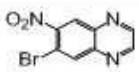
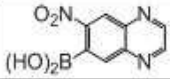
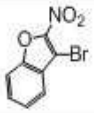
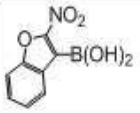
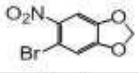
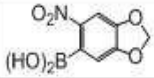
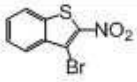
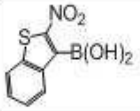
[0121] 상기 중간체 C-1의 제조 방법으로 하기 [표 2]의 화합물을 얻었다:

표 2

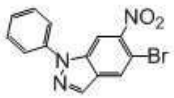
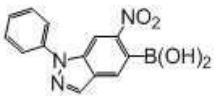
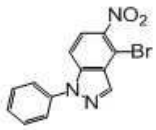
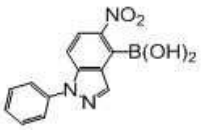
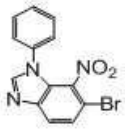
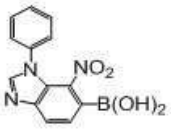
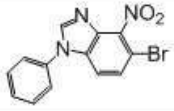
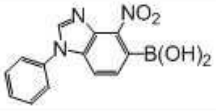
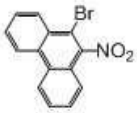
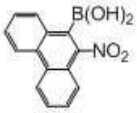
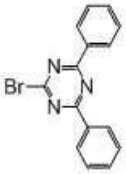
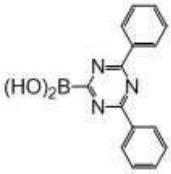
	반응물질	생성물질	수율
C-2			65
C-3			48
C-4			52
C-5			57
C-6			52
C-7			51
C-8			54
C-9			48
C-10			46

[0122]

[0123]

C-11			45
C-12			47
C-13			43
C-14			41
C-15			58
C-16			52
C-17			54
C-18			48
C-19			43
C-20			49
C-21			48
C-22			46
C-23			43

[0124]

C-24			47
C-25			43
C-26			42
C-27			45
C-28			58
C-29			46
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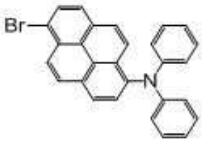
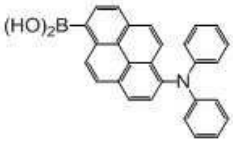
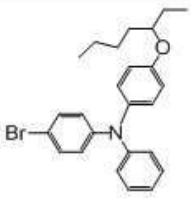
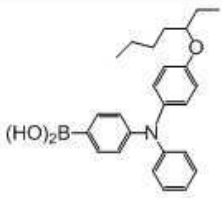
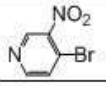
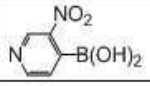
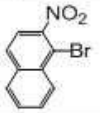
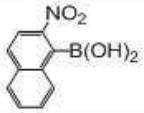
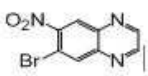
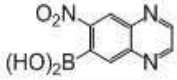
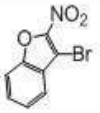
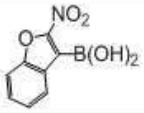
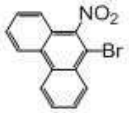
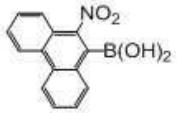
C-31			65

[0125]

C-32			72
C-33			46
C-34			52
C-35			48
C-36			43
C-37			63

[0127] * 중간체 D-1 내지 D-30의 제조

[0128] 상기 중간체 B-1의 제조 방법으로 하기 [표 3]의 화합물을 얻었다.

표 3

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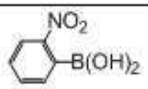
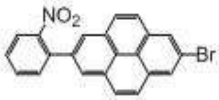
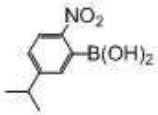
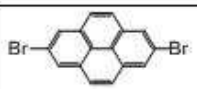
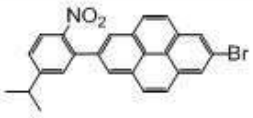
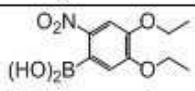
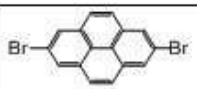
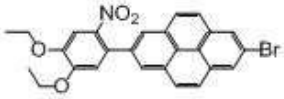
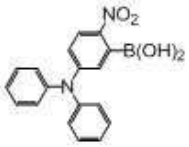
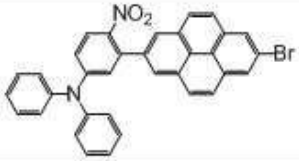
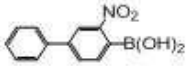
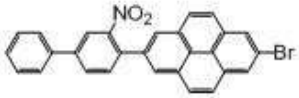
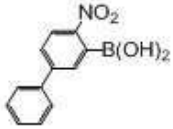
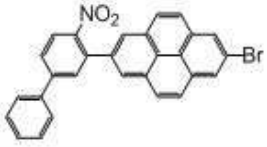
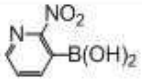
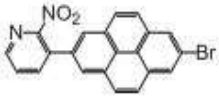
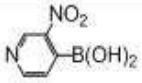
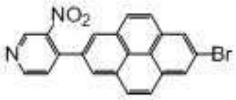
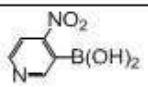
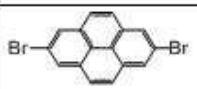
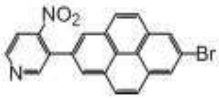
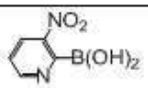
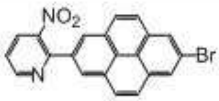
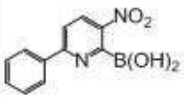
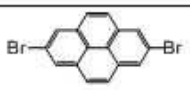
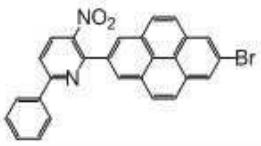
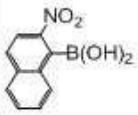
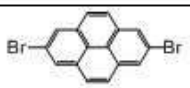
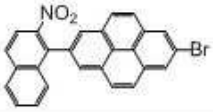
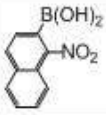
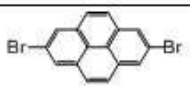
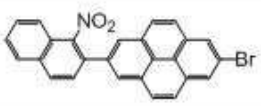
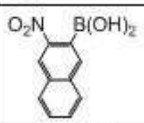
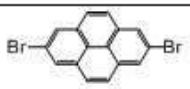
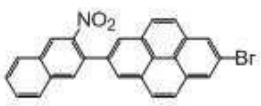
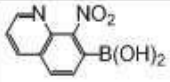
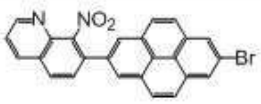
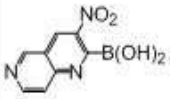
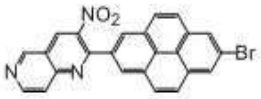
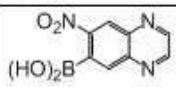
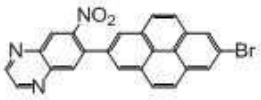
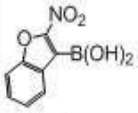
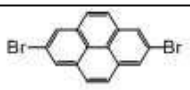
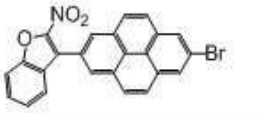
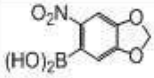
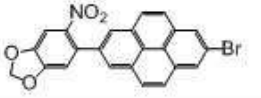
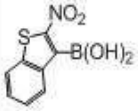
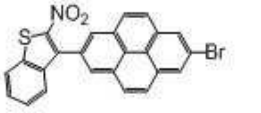
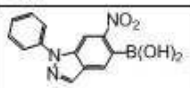
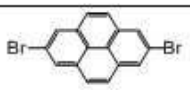
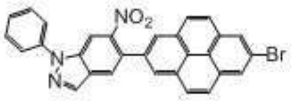
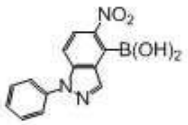
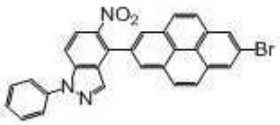
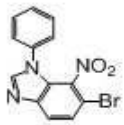
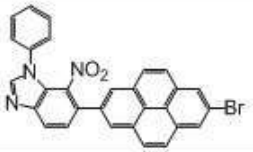
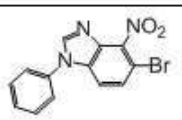
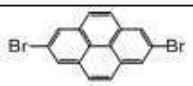
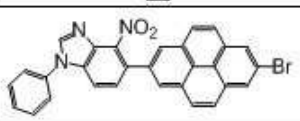
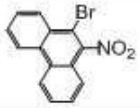
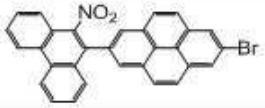
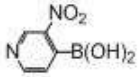
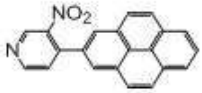
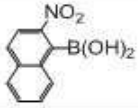
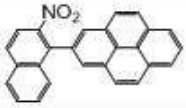
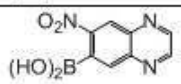
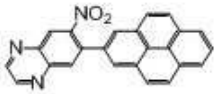
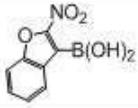
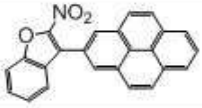
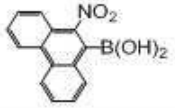
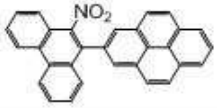
D-1				73
D-2				71
D-3				75
D-4				69
D-5				71
D-6				68
D-7				63
D-8				61
D-9				62
D-10				61

[0129]

D-11				58
D-12				65
D-13				63
D-14				61
D-15				56
D-16				53
D-17				57
D-18				53
D-19				55
D-20				53
D-21				54

[0130]

[0131]

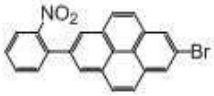
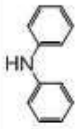
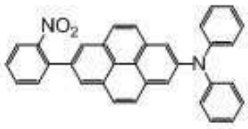
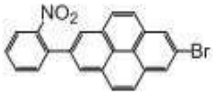
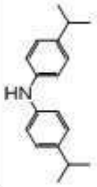
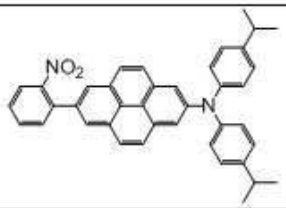
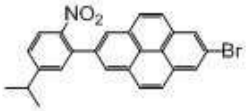
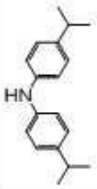
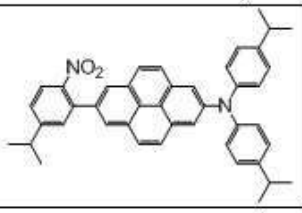
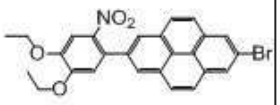
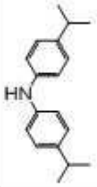
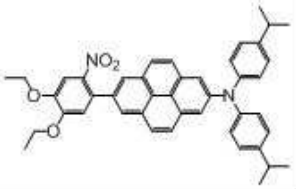
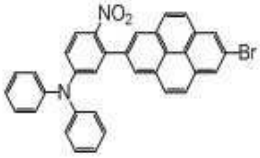
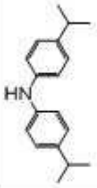
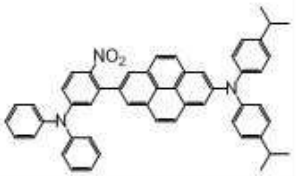
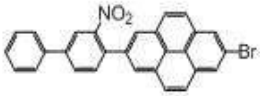
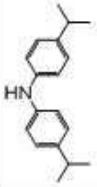
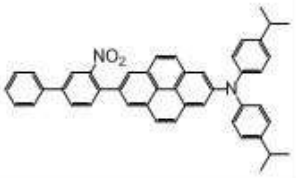
D-22				52
D-23				51
D-24				53
D-25				69
D-26				65
D-27				72
D-28				63
D-29				69
D-30				81

[0133] * 중간체 E-1 내지 E-43의 제조

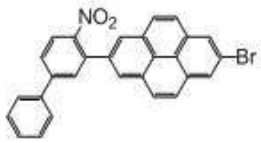
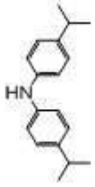
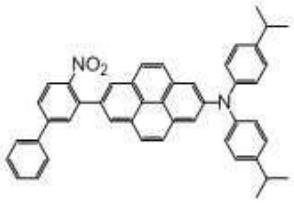
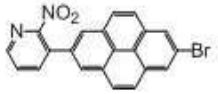
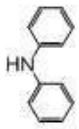
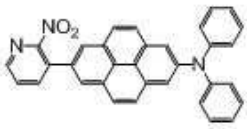
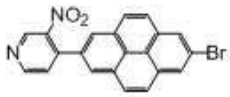
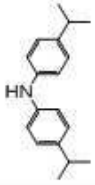
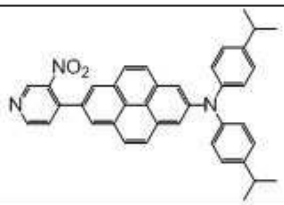
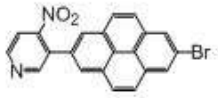
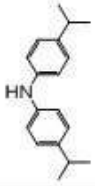
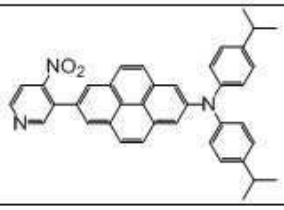
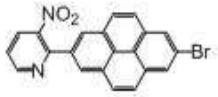
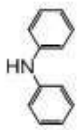
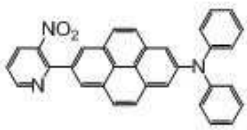
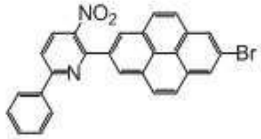
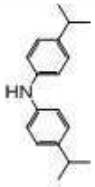
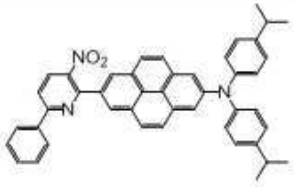
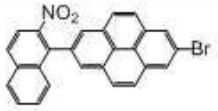
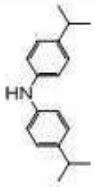
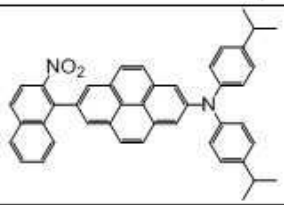
[0134] 상기 중간체 A-1의 제조 방법으로 하기 [표 4]의 화합물을 얻었다.

표 4

[0135]

	반응물질		생성물질	수율
E-1				82
E-2				83
E-3				85
E-4				82
E-5				81
E-6				84

[0136]

E-7				82
E-8				83
E-9				84
E-10				82
E-11				83
E-12				81
E-13				87

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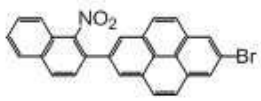
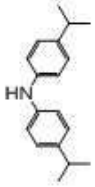
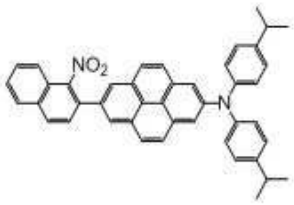
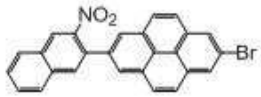
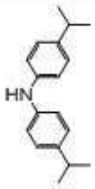
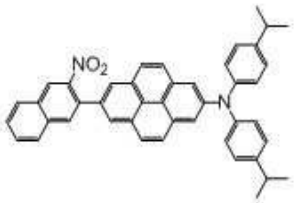
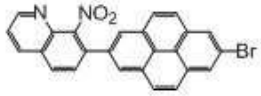
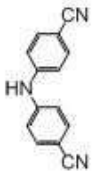
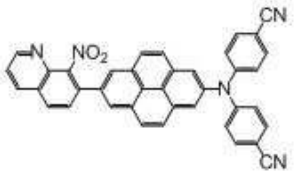
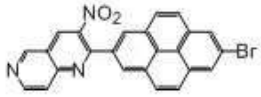
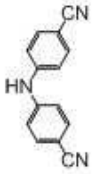
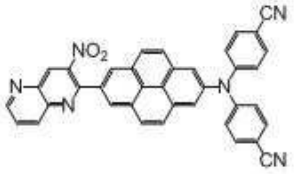
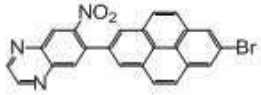
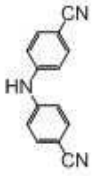
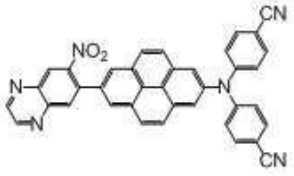
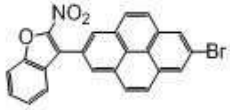
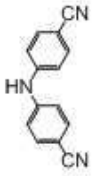
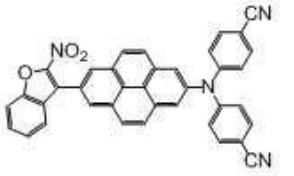
E-14				85
E-15				84
E-16				75
E-17				73
E-18				74
E-19				75

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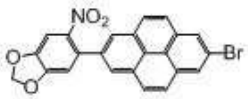
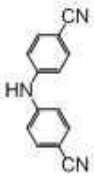
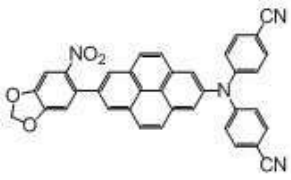
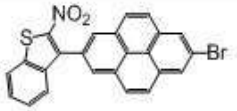
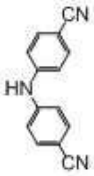
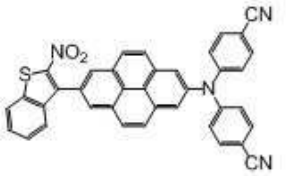
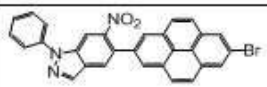
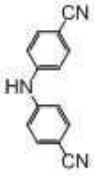
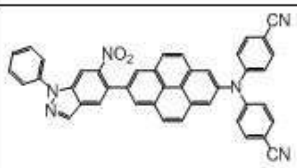
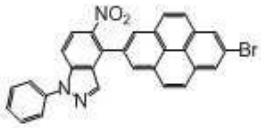
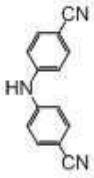
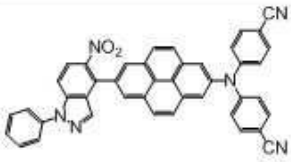
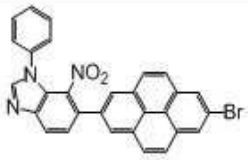
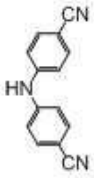
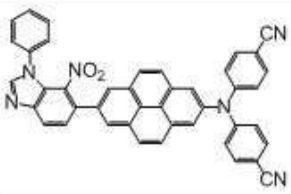
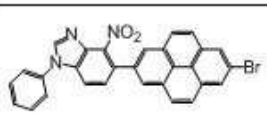
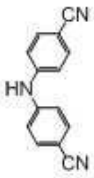
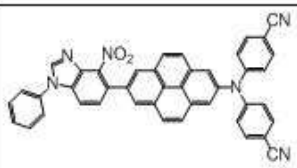
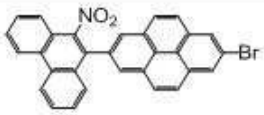
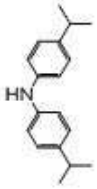
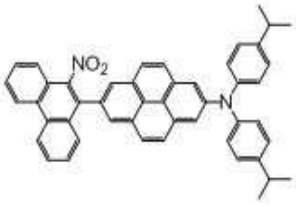
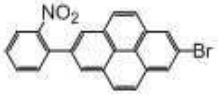
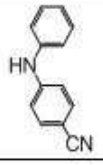
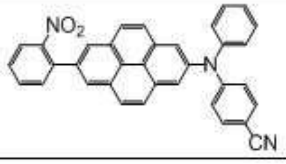
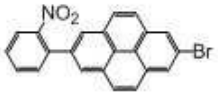
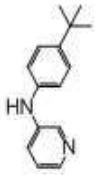
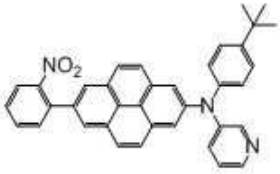
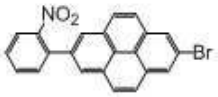
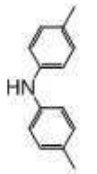
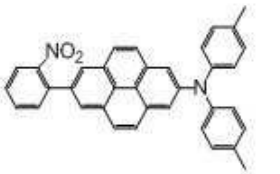
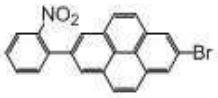
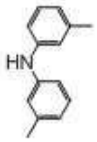
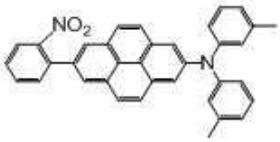
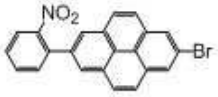
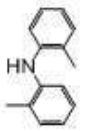
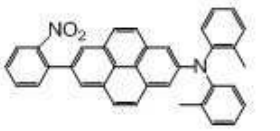
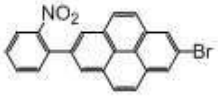
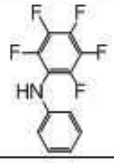
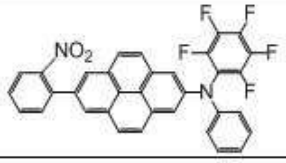
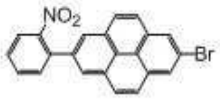
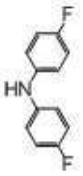
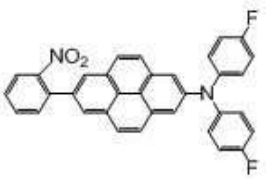
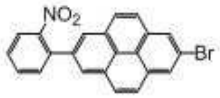
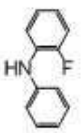
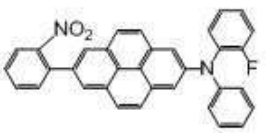
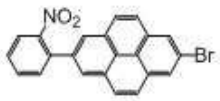
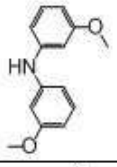
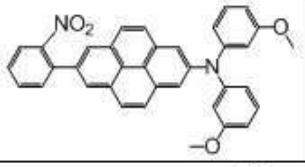
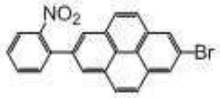
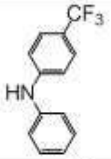
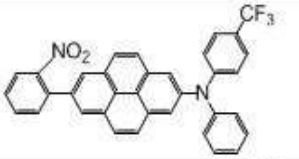
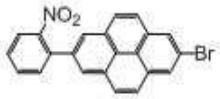
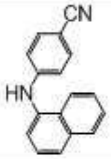
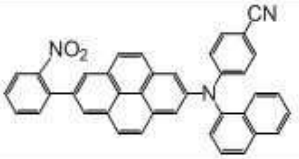
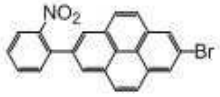
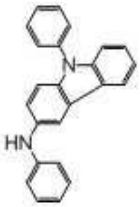
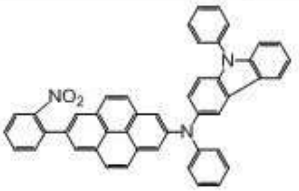
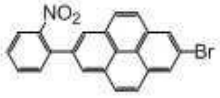
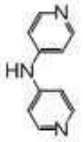
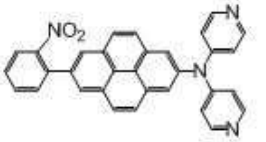
E-20				73
E-21				71
E-22				73
E-23				71
E-24				73
E-25				71

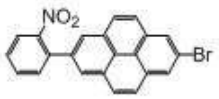
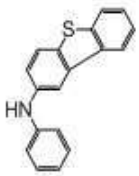
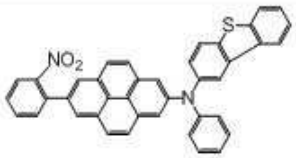
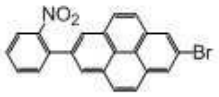
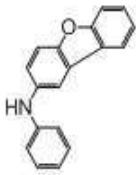
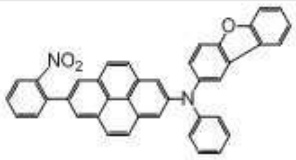
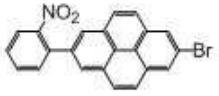
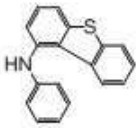
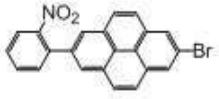
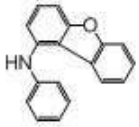
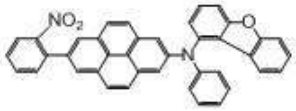
[0139]

E-26				83
E-27				75
E-28				71
E-29				70
E-30				69
E-31				68
E-32				65

[0140]

E-33				72
E-34				69
E-35				73
E-36				68
E-37				71
E-38				72
E-39				68

[0141]

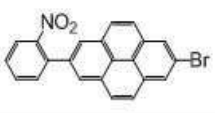
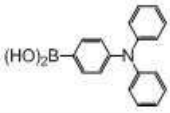
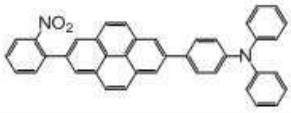
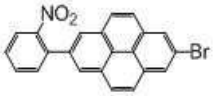
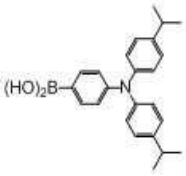
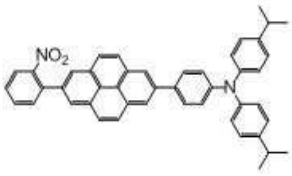
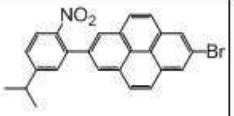
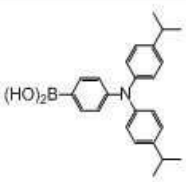
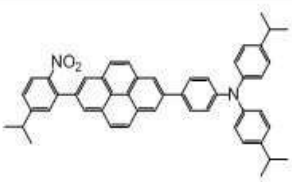
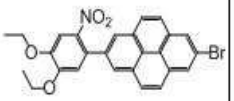
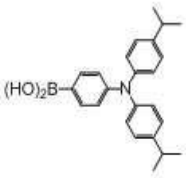
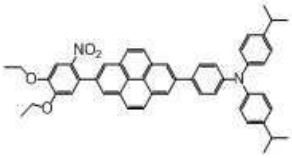
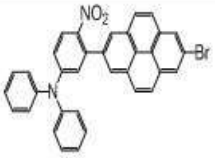
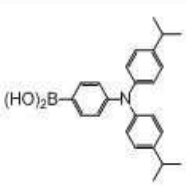
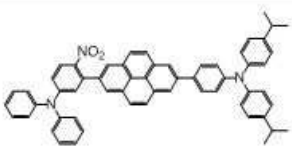
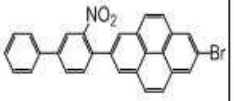
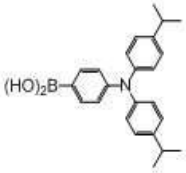
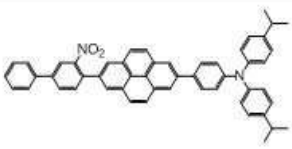
E-40				69
E-41				67
E-42				68
E-43				66

[0143] * 중간체 F-1 내지 F-34의 제조

[0144] 상기 중간체 B-1의 제조 방법으로 하기 [표 5]의 화합물을 얻었다.

표 5

[0145]

	반응물질		생성물질	수율
F-1				87
F-2				86
F-3				85
F-4				83
F-5				86
F-6				85

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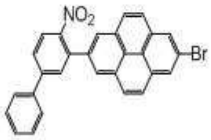
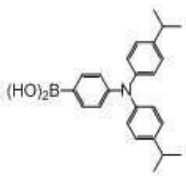
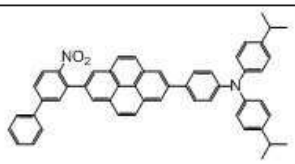
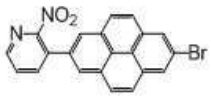
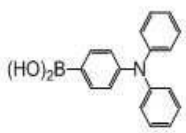
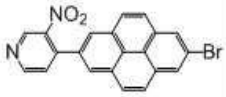
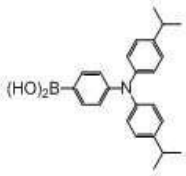
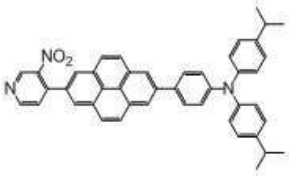
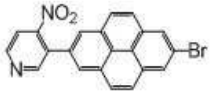
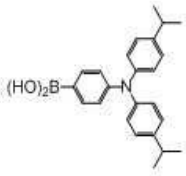
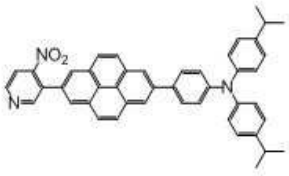
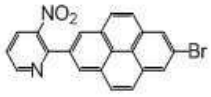
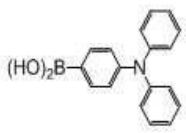
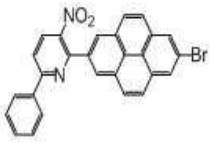
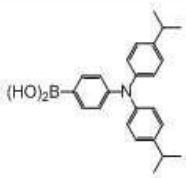
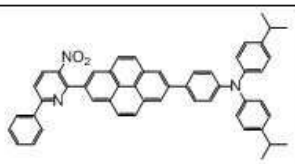
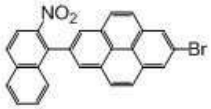
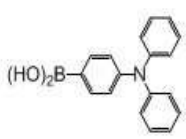
F-7				84
F-8				82
F-9				85
F-10				83
F-11				84
F-12				81
F-13				82

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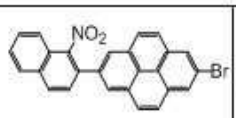
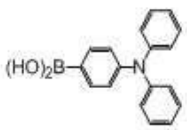
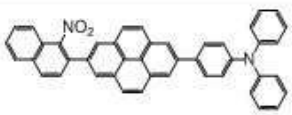
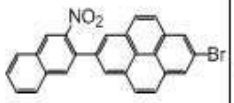
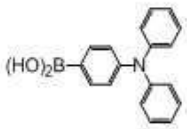
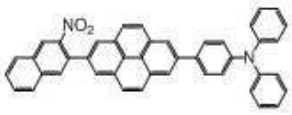
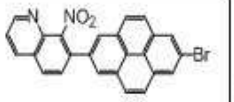
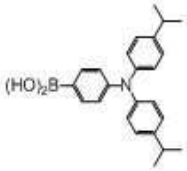
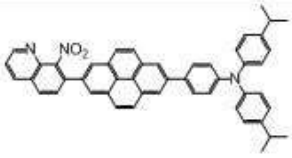
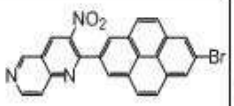
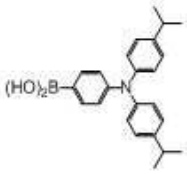
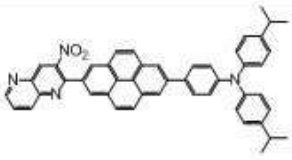
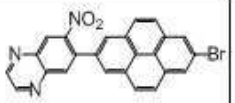
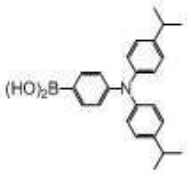
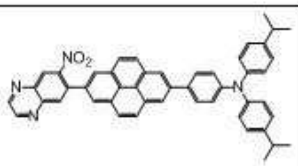
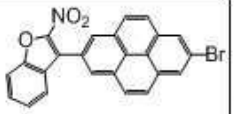
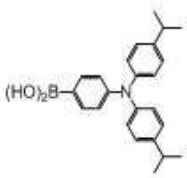
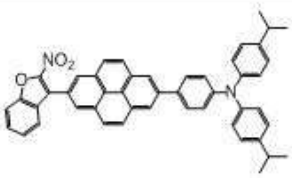
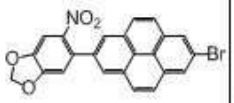
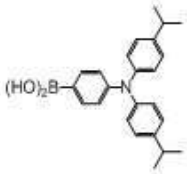
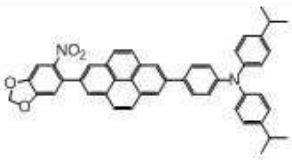
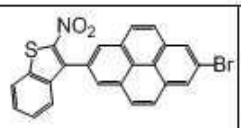
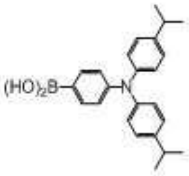
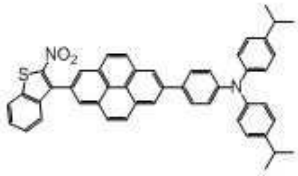
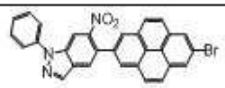
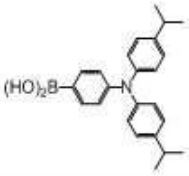
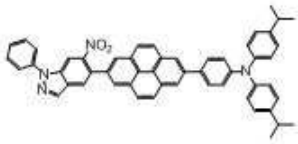
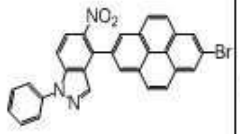
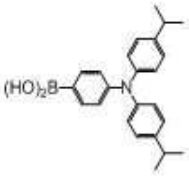
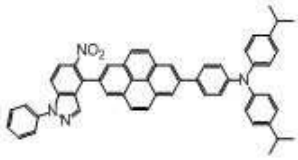
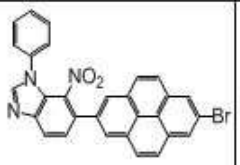
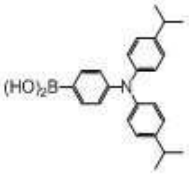
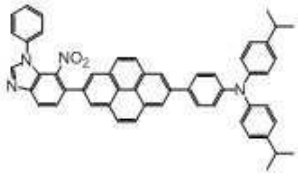
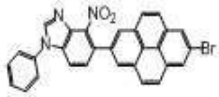
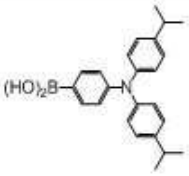
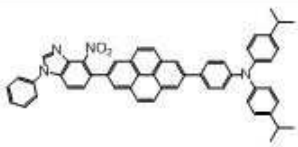
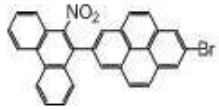
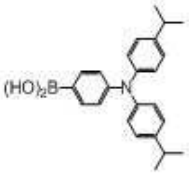
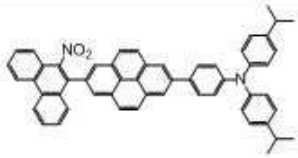
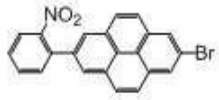
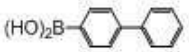
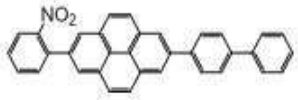
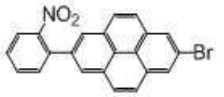
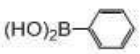
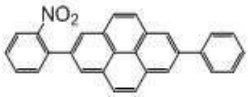
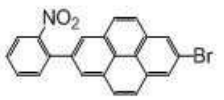
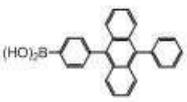
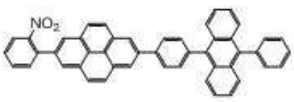
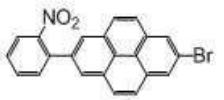
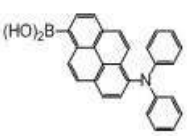
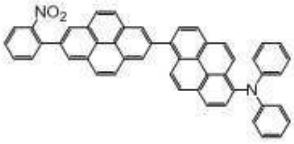
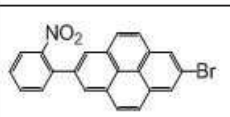
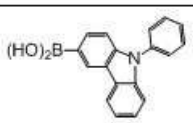
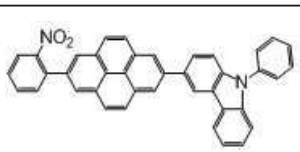
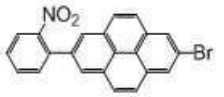
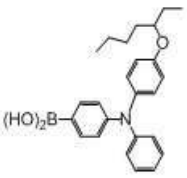
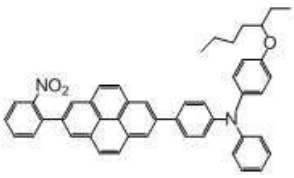
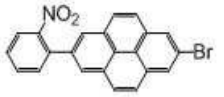
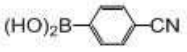
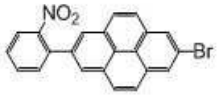
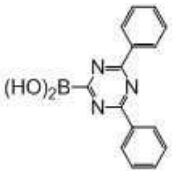
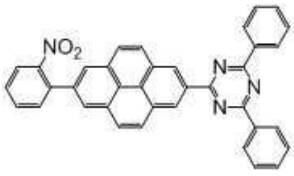
F-14				80
F-15				83
F-16				79
F-17				76
F-18				78
F-19				75
F-20				73

[0148]

F-21				72
F-22				76
F-23				77
F-24				75
F-25				76
F-26				83
F-27				82

[0149]

F-28				81
F-29				79
F-30				74
F-31				81
F-32				83
F-33				75
F-34				72

[0151] * 중간체 (4-((3-cyanophenyl)(phenyl)amino)phenyl)boronic acid (G-1)의 제조

G-1

[0152]

[0153] 반응기에 7-(2-nitrophenyl)-N,N-diphenylpyren-2-amine 4.9g (10.0mmol) 와 PPh3 5.77g (22mmol) 을 1,2-다이클로로벤젠(30ml)에 녹인 다음, 170℃에서 12시간 교반하였다. 반응물을 냉각시킨 후 진공조건에서 용매를 제거하고 증류수와 다이클로로메탄 용액(50mL : 50mL) 세차례 추출한다. 모아진 유기층을 마그네슘설페이트로 건조하고 용매를 증발하여 얻어진 잔류물을 실리카젤관 크로마토그래피로 분리하여 G-1 3.3g (수율72%) 을 얻었다.

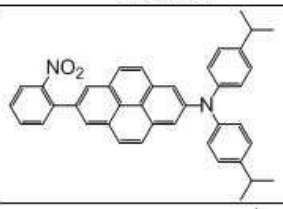
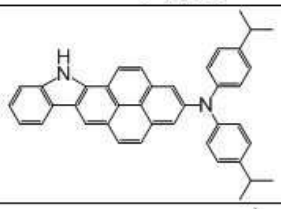
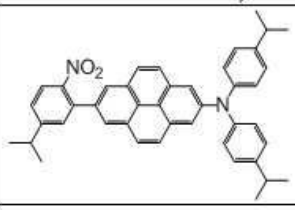
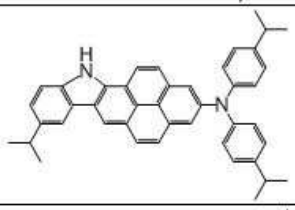
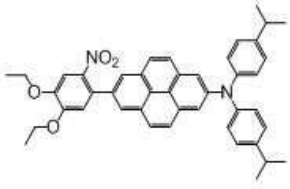
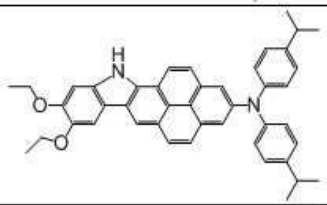
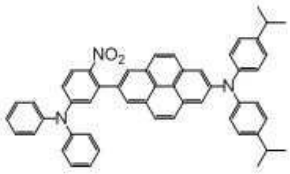
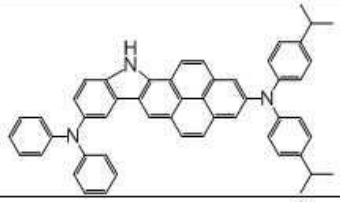
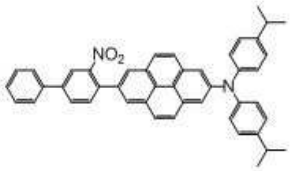
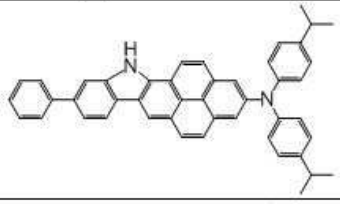
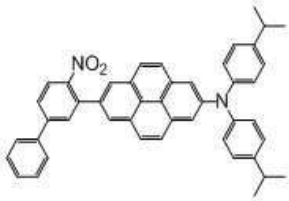
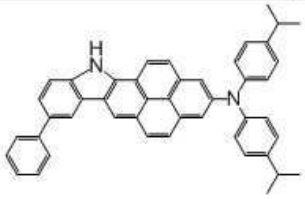
[0154] 질량 스펙트럼m/z : 458.55(계산치 : 458.18)

[0156] * 중간체 H-2 내지 H-83의 제조

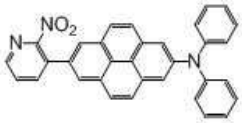
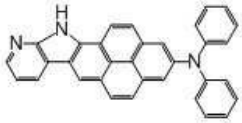
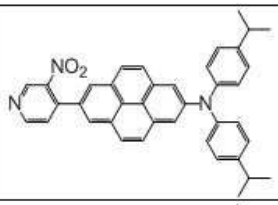
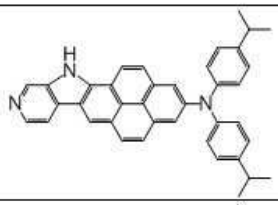
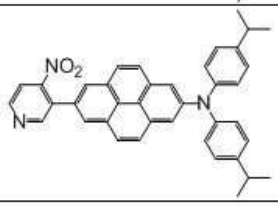
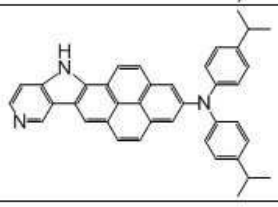
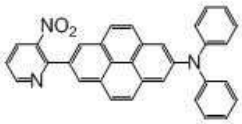
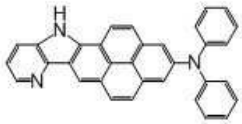
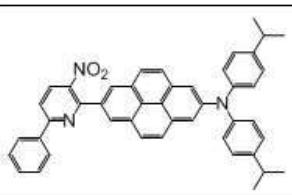
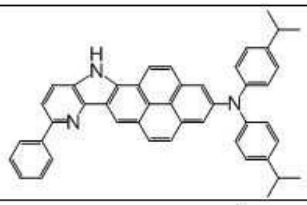
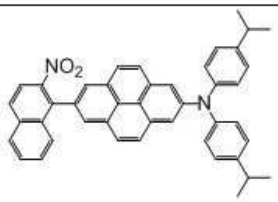
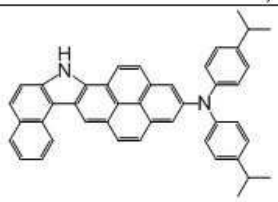
[0157] 상기 중간체 H-1의 제조 방법으로 하기 [표 6]의 화합물을 얻었다:

표 6

[0158]

	반응물질	생성물질	수율
G-2			75
G-3			72
G-4			68
G-5			69
G-6			68
G-7			71

[0159]

G-8			72
G-9			69
G-10			71
G-11			68
G-12			64
G-13			73

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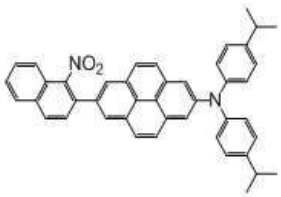
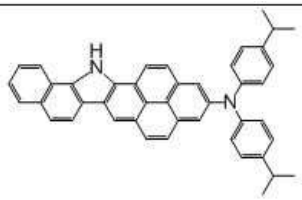
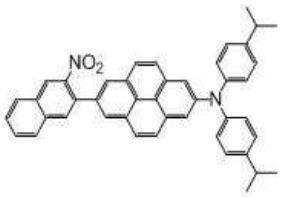
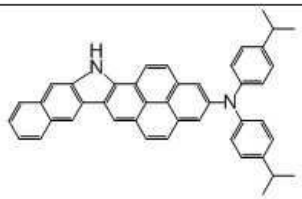
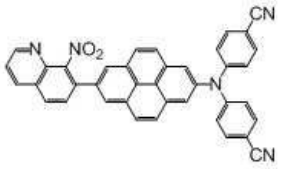
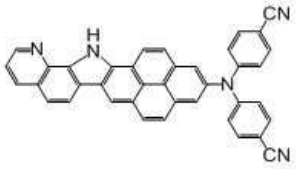
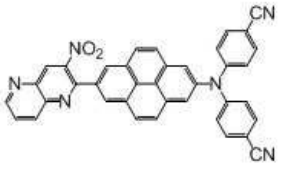
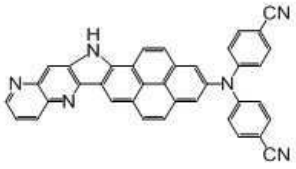
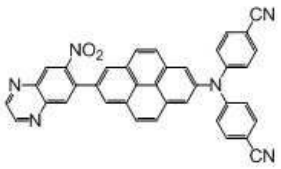
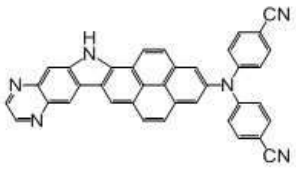
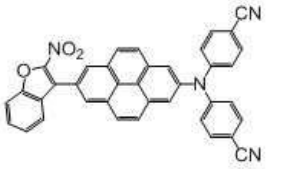
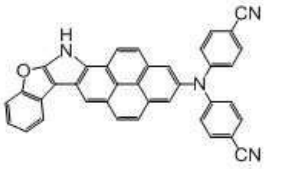
G-14			71
G-15			70
G-16			68
G-17			69
G-18			65
G-19			61

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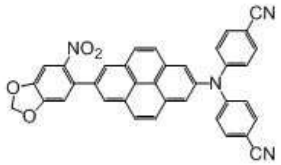
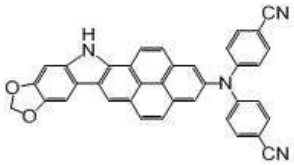
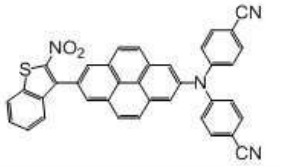
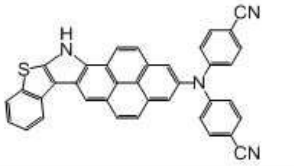
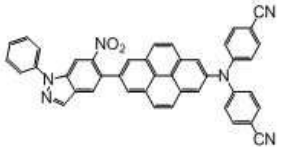
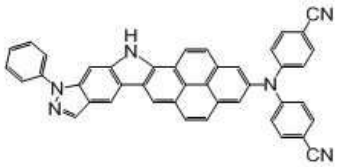
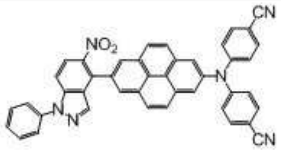
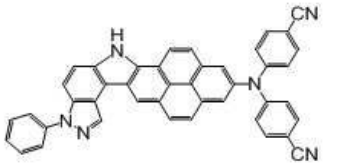
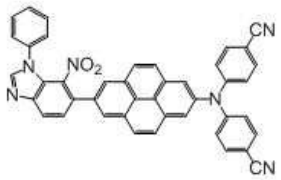
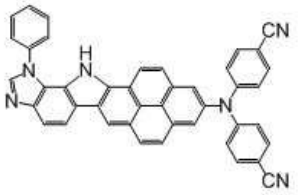
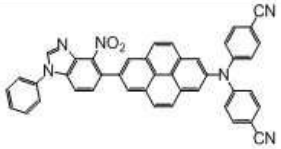
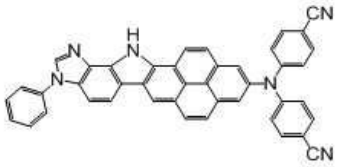
G-20			71
G-21			63
G-22			70
G-23			68
G-24			67
G-25			69

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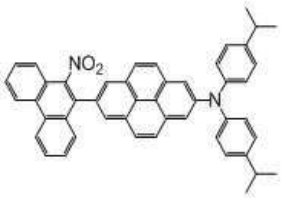
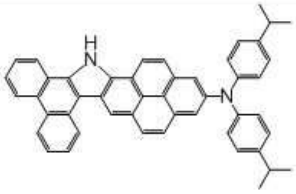
G-26			76
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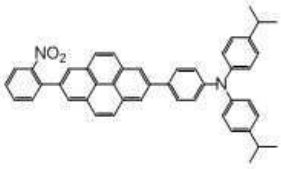
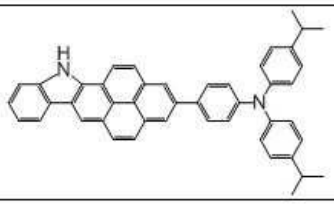
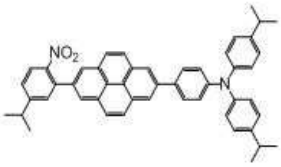
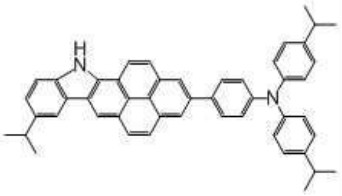
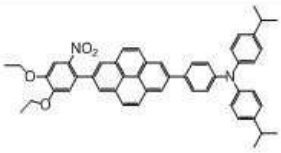
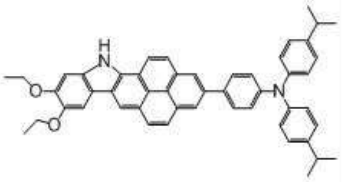
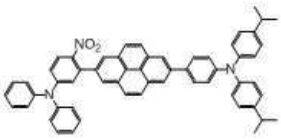
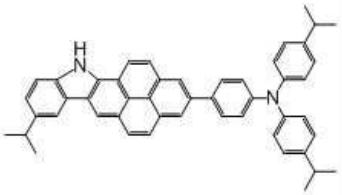
G-28			74
G-29			73
G-30			68
G-31			65

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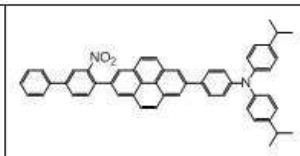
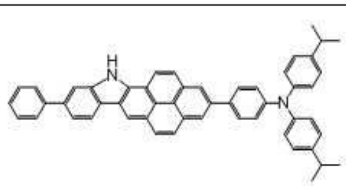
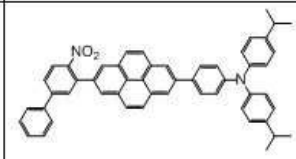
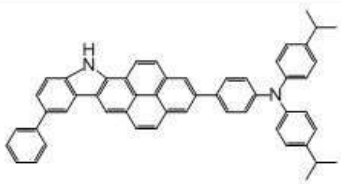
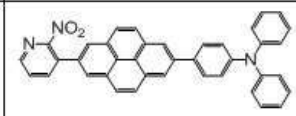
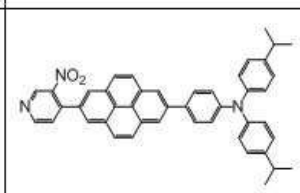
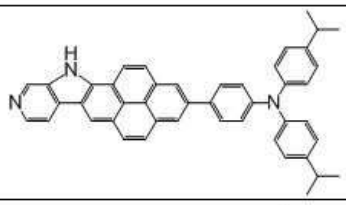
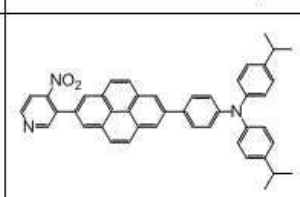
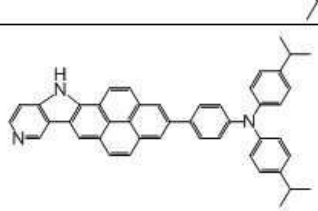
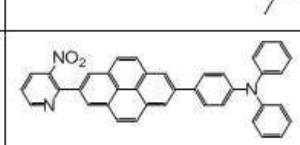
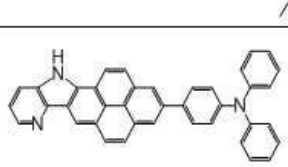
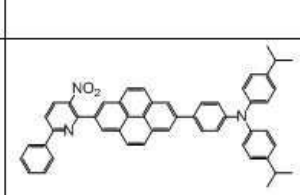
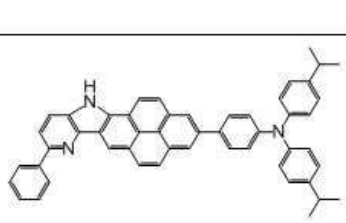
G-32			63
G-33			66
G-34			61
G-35			63
G-36			65
G-37			62
G-38			54

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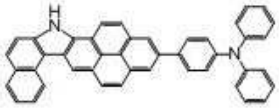
G-39			68
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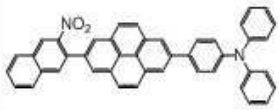
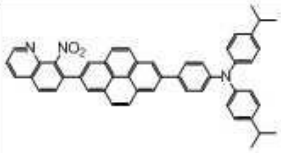
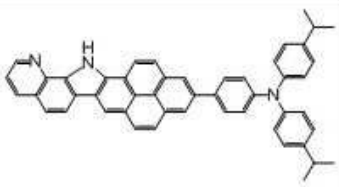
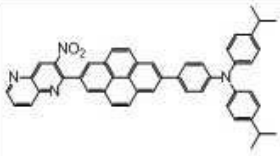
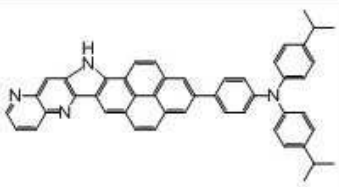
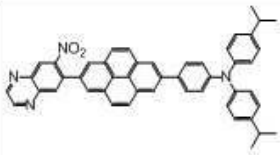
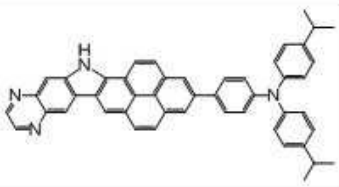
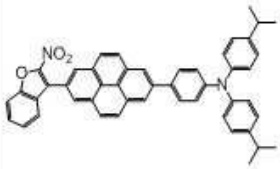
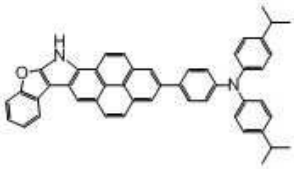
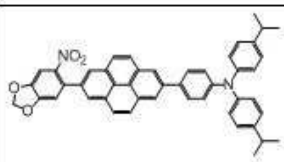
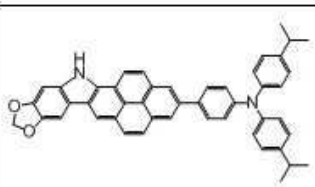
G-41			65
G-42			61
G-43			58
G-44			59
G-45			51
G-46			63

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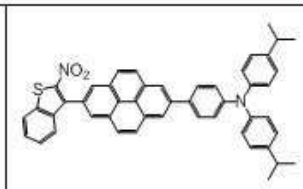
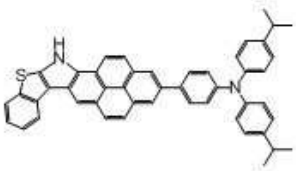
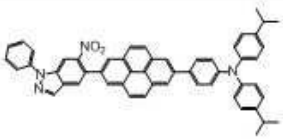
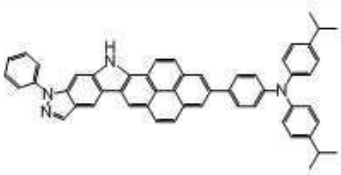
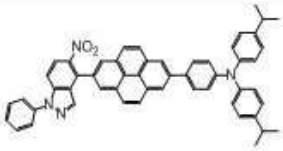
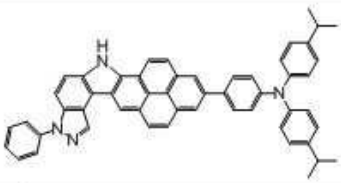
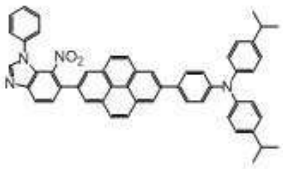
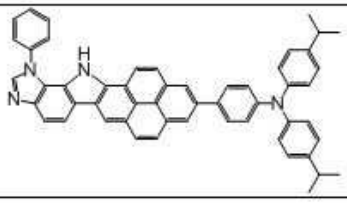
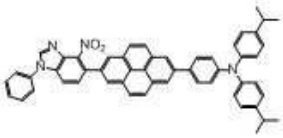
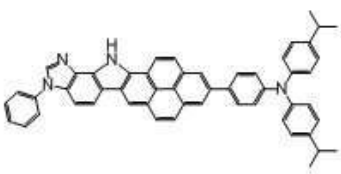
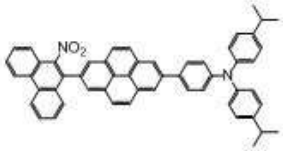
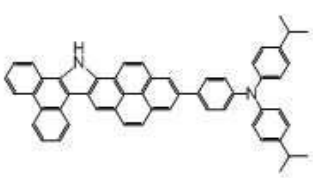
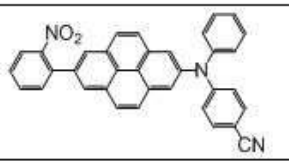
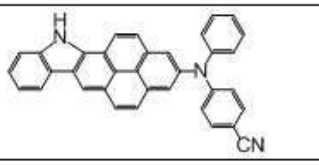
G-47			52
G-48			64
G-49			63
G-50			61
G-51			66
G-52			73
G-53			69

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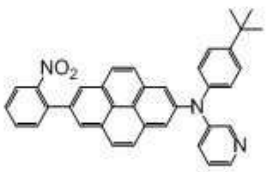
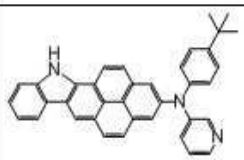
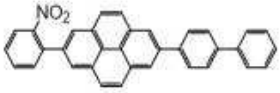
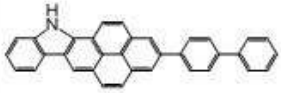
G-54			67
G-55			71
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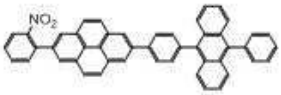
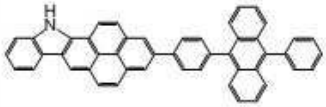
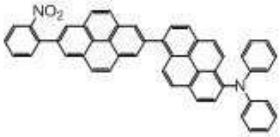
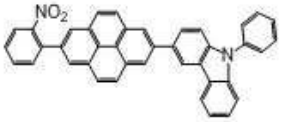
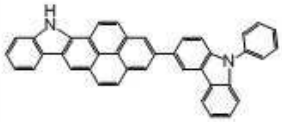
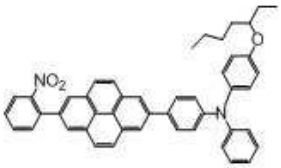
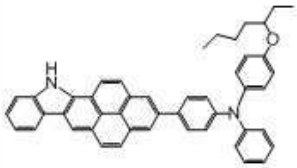
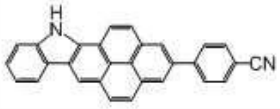
G-57			67
G-58			62
G-59			69
G-60			67
G-61			64

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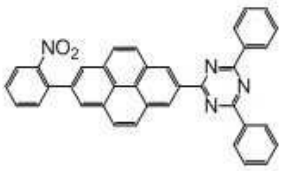
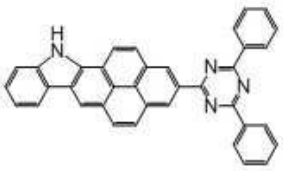
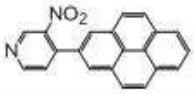
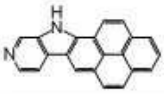
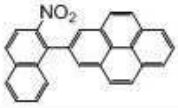
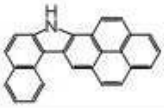
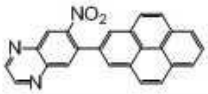
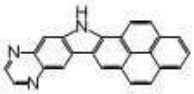
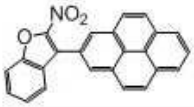
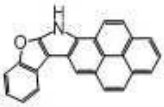
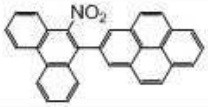
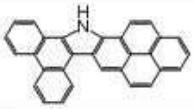
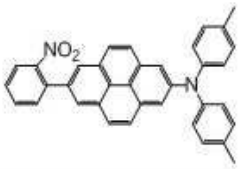
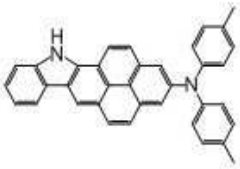
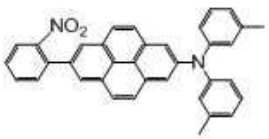
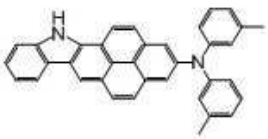
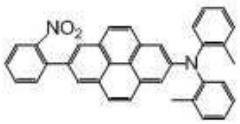
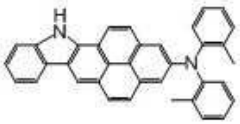
G-62			62
G-63			65
G-64			71
G-65			64
G-66			53
G-67			76
G-68			73
G-69			71
G-70			69

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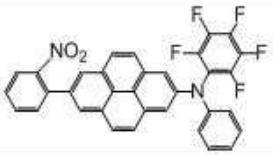
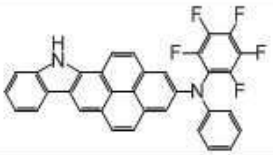
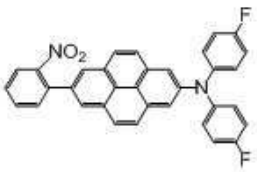
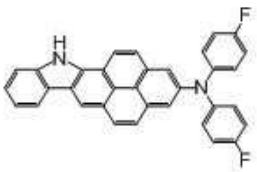
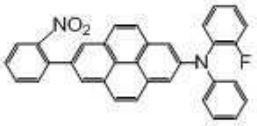
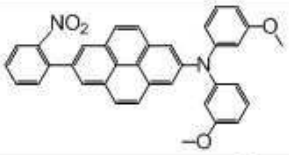
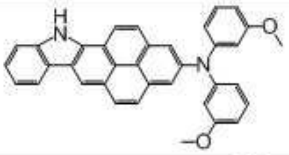
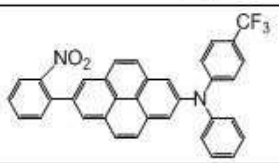
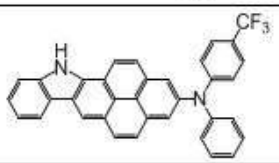
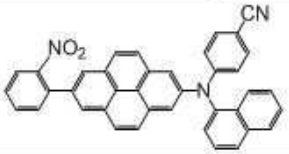
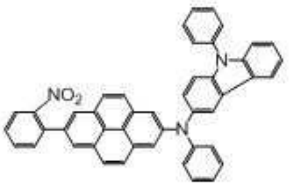
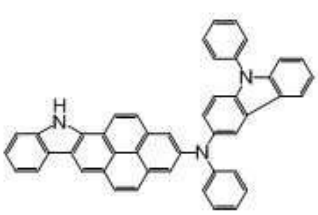
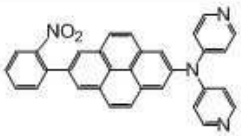
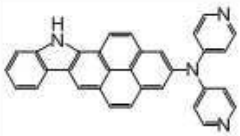
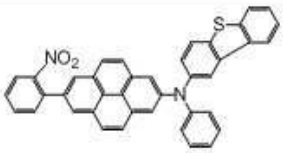
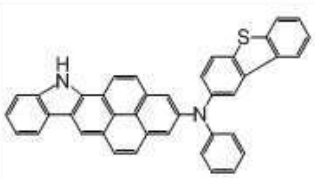
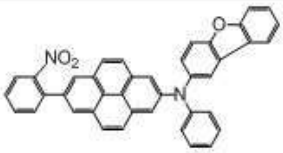
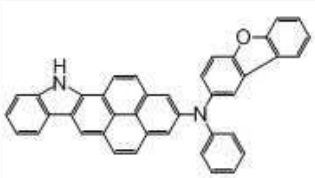
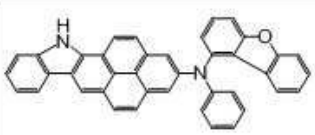
G-71			68
G-72			72
G-73			67
G-74			71
G-75			69
G-76			67
G-78			71

[0169]

G-79			69
G-80			68
G-81			66
G-82			67
G-83			65

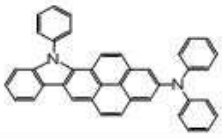
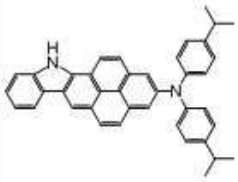
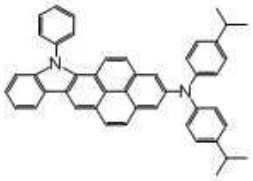
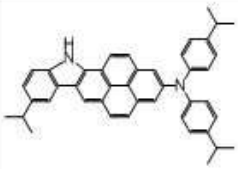
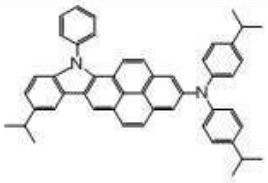
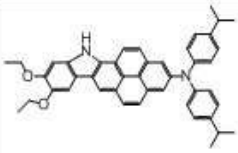
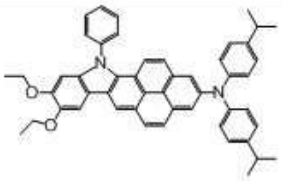
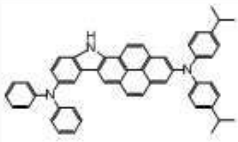
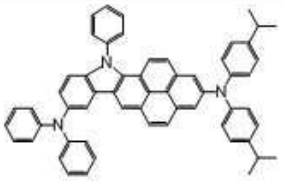
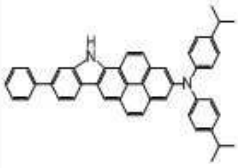
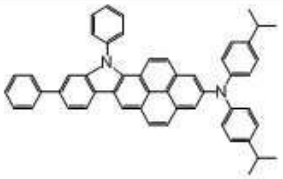
[0171] **실시예의 제조**

[0172] * 실시예 H-1 내지 H-90의 제조

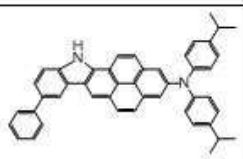
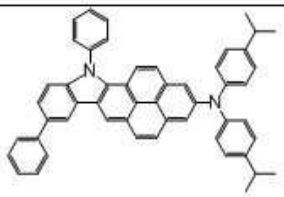
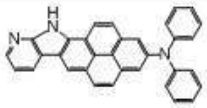
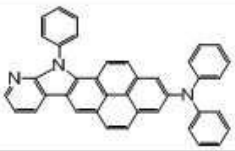
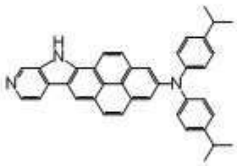
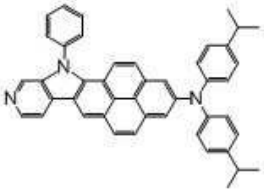
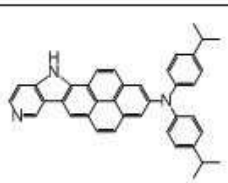
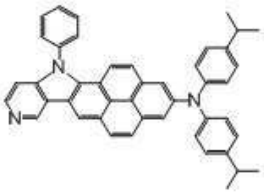
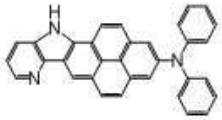
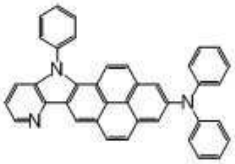
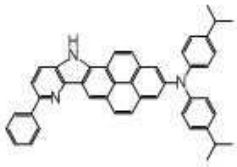
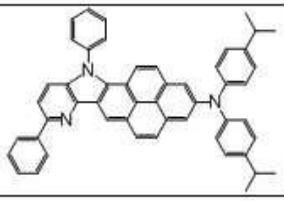
[0173] 상기 A-1의 제조 방법으로 하기 [표 7]의 화합물을 얻었다:

표 7

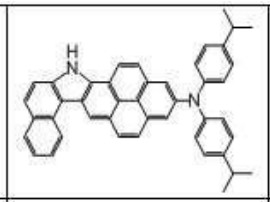
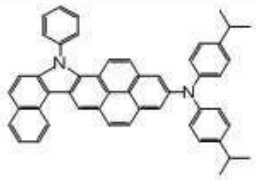
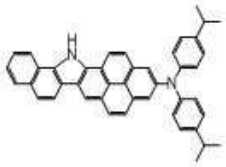
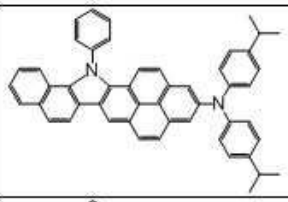
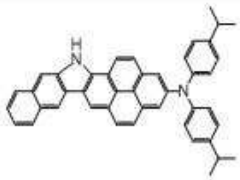
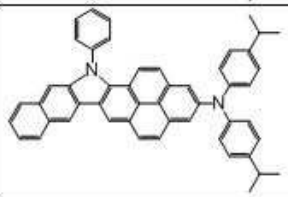
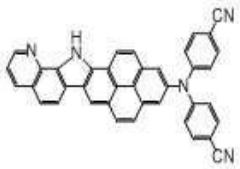
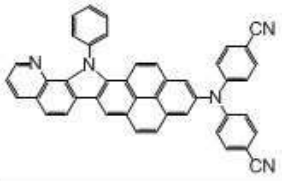
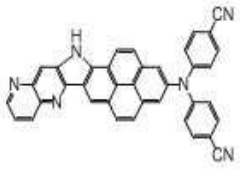
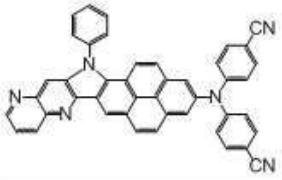
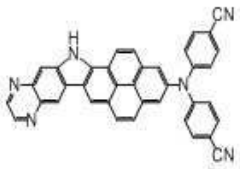
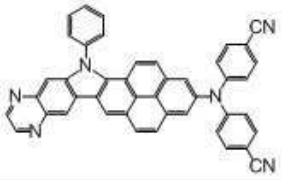
[0174]

	반응물질		생성물질	수율
H-1				85
H-2				87
H-3				83
H-4				87
H-5				81
H-6				86

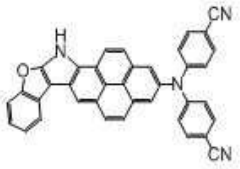
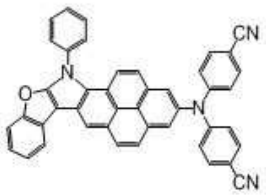
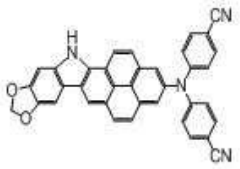
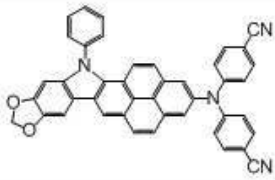
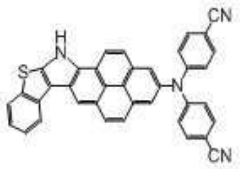
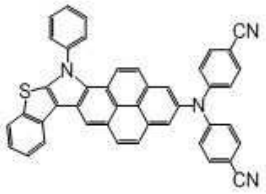
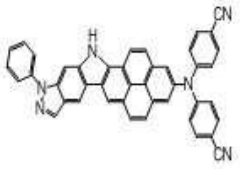
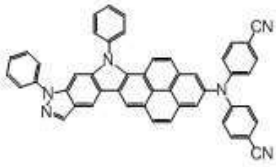
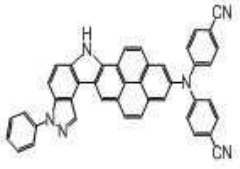
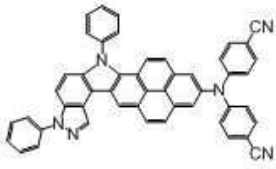
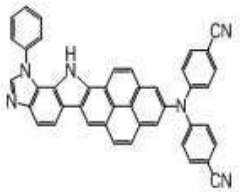
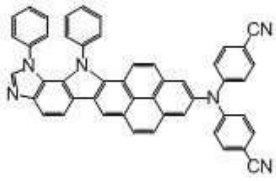
[0175]

H-7				81
H-8				75
H-9				76
H-10				79
H-11				77
H-12				76

[0176]

H-13				83
H-14				82
H-15				84
H-16				75
H-17				73
H-18				75

[0177]

H-19				65
H-20				73
H-21				64
H-22				75
H-23				78
H-24				65

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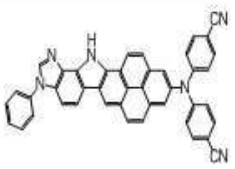
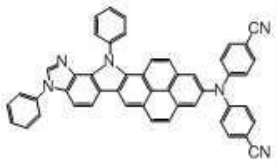
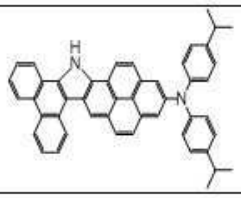
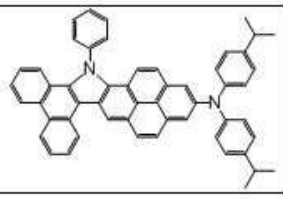
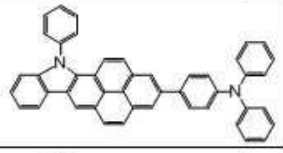
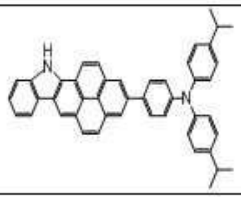
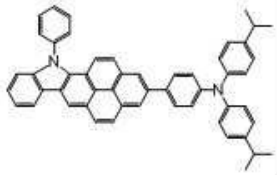
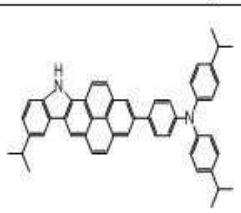
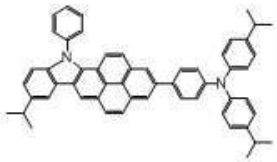
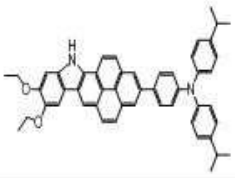
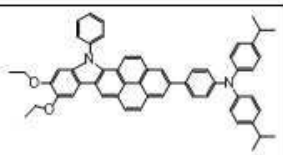
H-25				69
H-26				82
H-27				85
H-28				83
H-29				81
H-30				86

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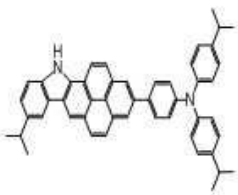
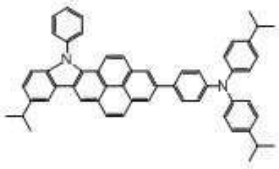
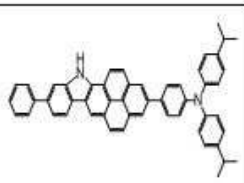
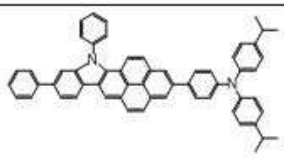
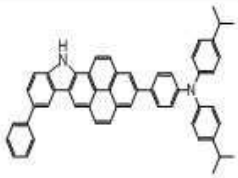
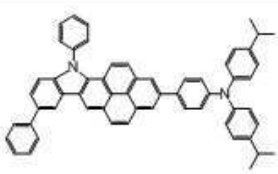
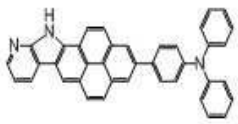
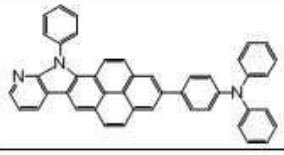
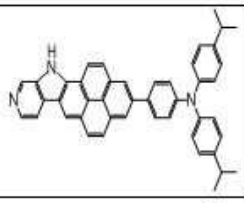
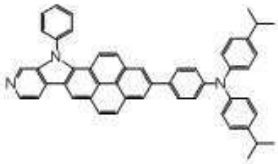
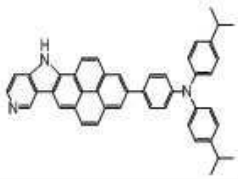
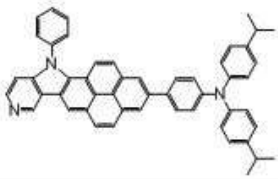
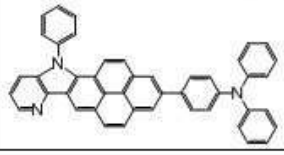
H-31				83
H-32				85
H-33				83
H-34				72
H-35				75
H-36				77
H-37				76

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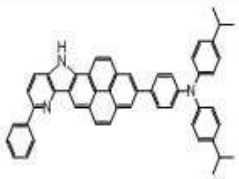
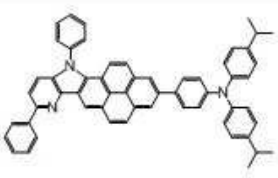
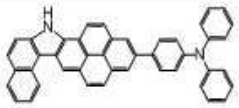
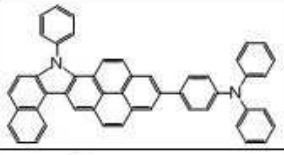
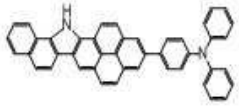
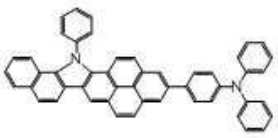
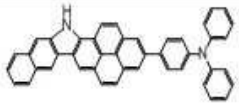
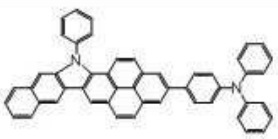
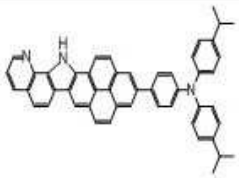
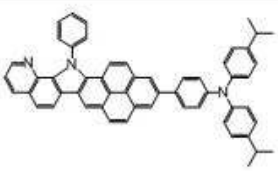
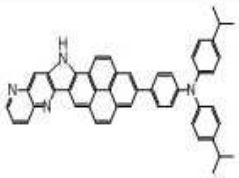
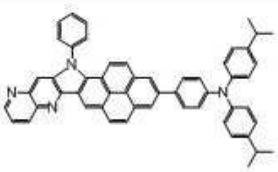
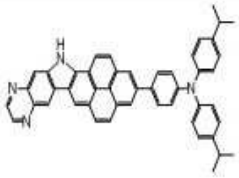
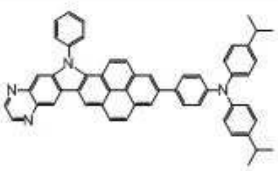
H-38				73
H-39				76
H-40				78
H-41				77
H-42				67
H-43				63
H-44				65

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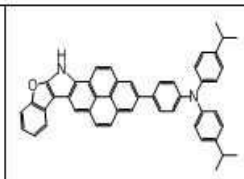
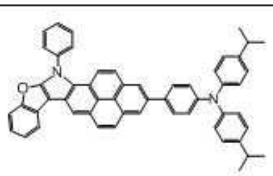
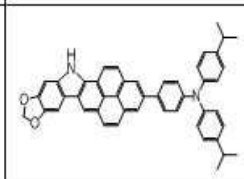
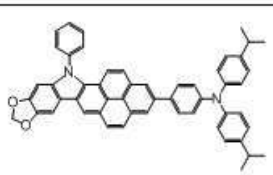
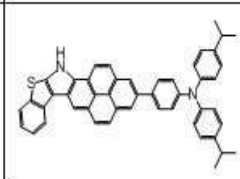
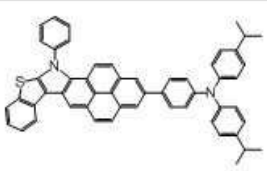
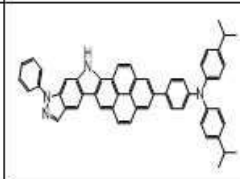
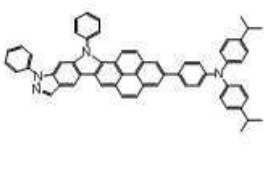
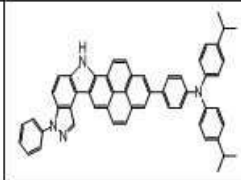
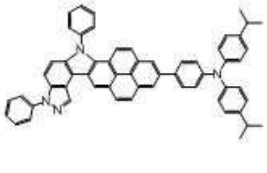
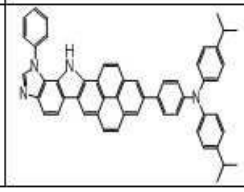
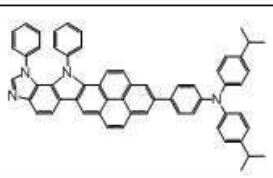
H-45				61
H-46				73
H-47				63
H-48				73
H-49				74
H-50				69

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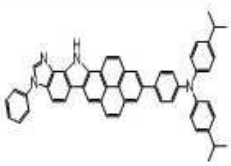
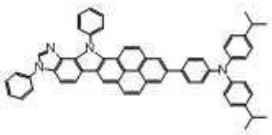
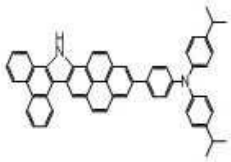
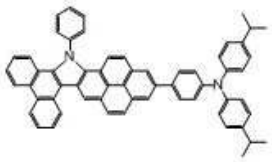
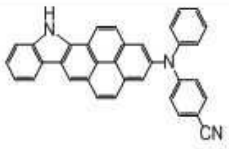
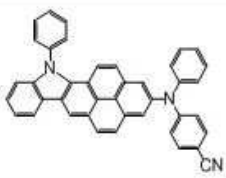
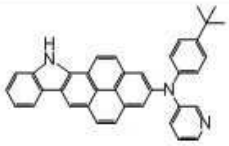
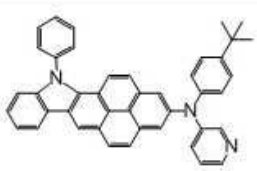
H-51				71
H-52				82
H-53				79
H-54				75
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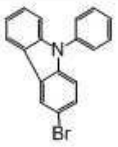
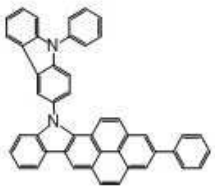
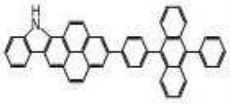
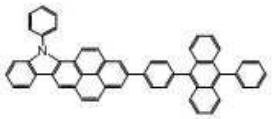
H-56				65
H-57				76

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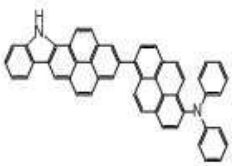
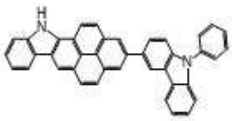
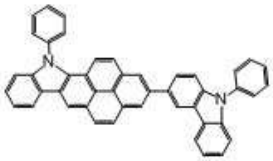
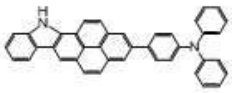
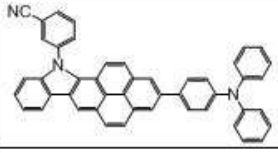
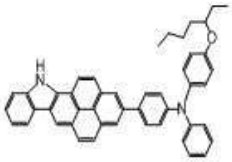
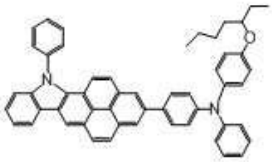
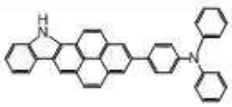
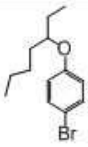
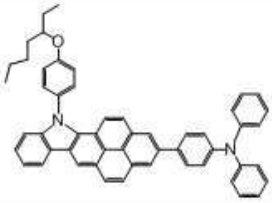
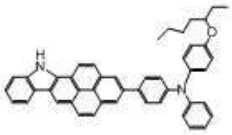
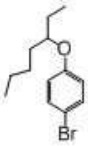
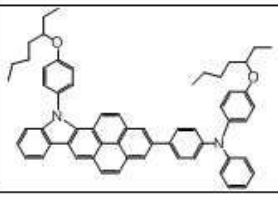
H-58				72
H-59				76
H-60				58
H-61				76
H-62				71
H-63				69

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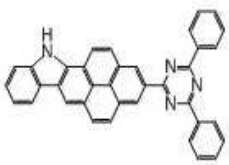
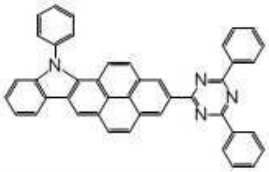
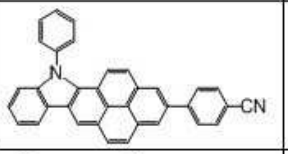
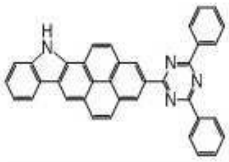
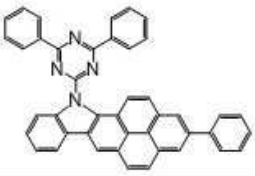
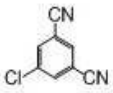
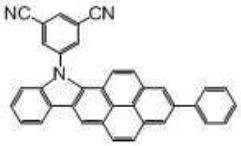
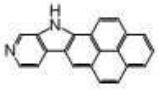
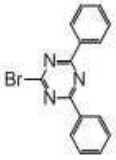
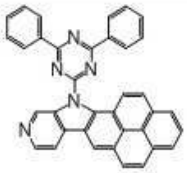
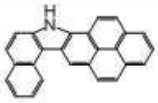
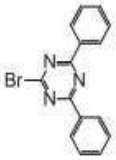
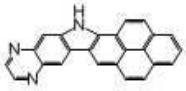
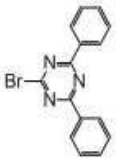
H-64				75
H-65				77
H-66				54
H-67				57
H-68				52
H-69				60
H-70				53

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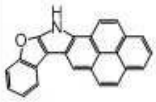
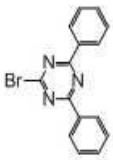
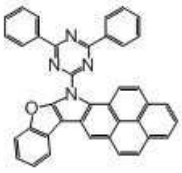
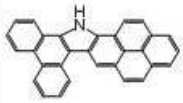
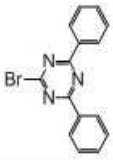
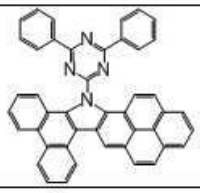
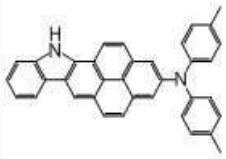
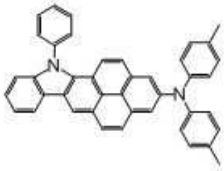
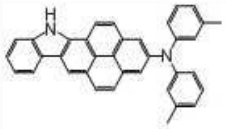
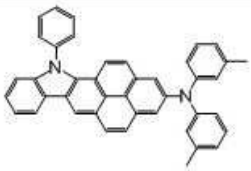
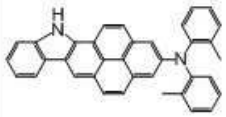
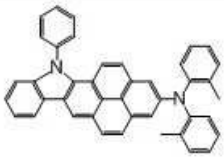
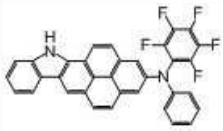
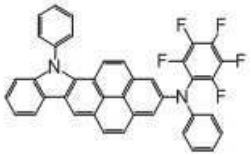
H-71				49
H-72				57
H-73				75
H-74				74
H-75				73
H-76				68

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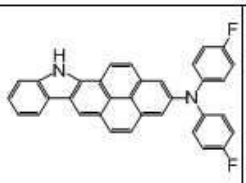
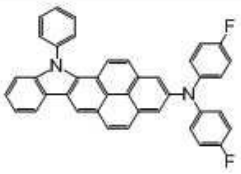
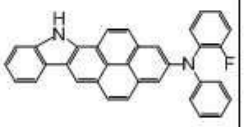
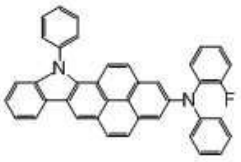
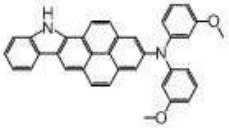
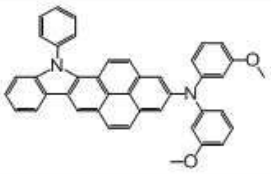
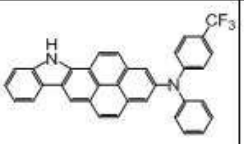
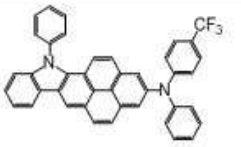
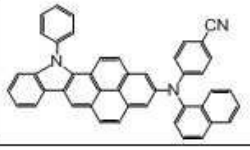
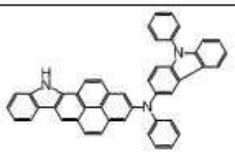
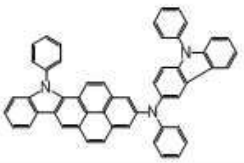
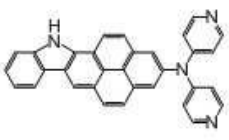
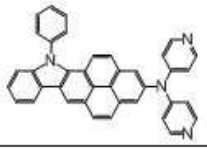
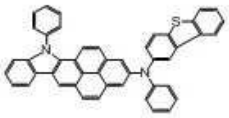
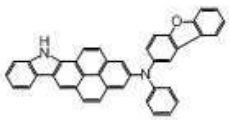
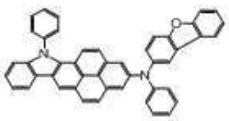
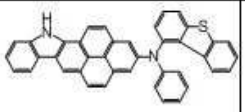
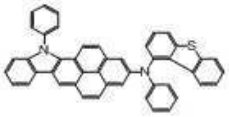
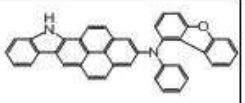
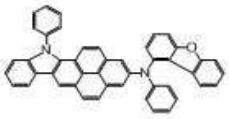
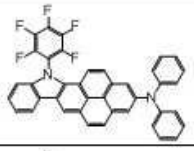
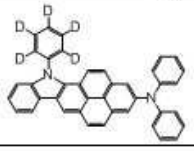
H-77				72
H-78				70
H-79				71
H-80				70
H-81				72
H-82				71
H-83				70

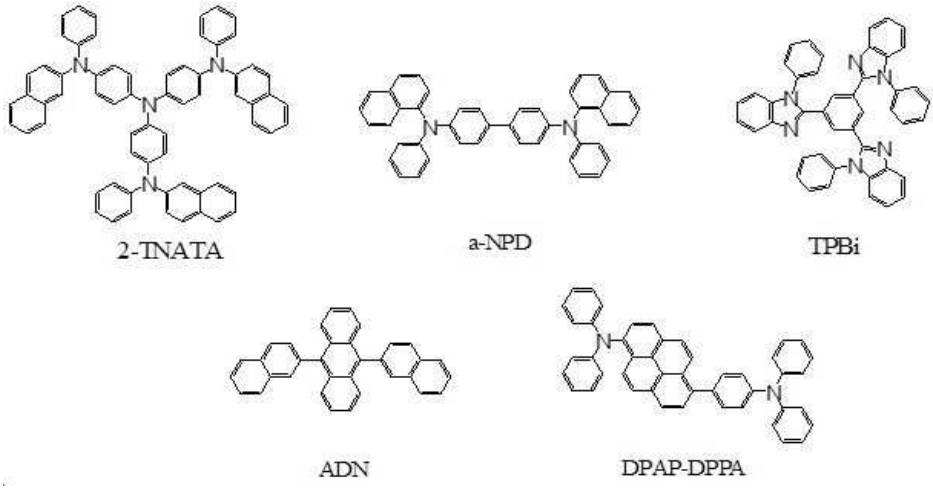
[0187]

H-84				71
H-85				72
H-86				70
H-87				71
H-88				66
H-89				67
H-90				65

[0189] **<실험예>**

[0190] ITO가 1500Å의 두께로 박막 코팅된 유리 기판을 피셔사의 세제를 녹인 2차 증류수에 넣고 초음파로 30분간 세척하였다. ITO를 30 분간 세척한 후 증류수로 2 회 반복하여 초음파 세척을 10 분간 진행하였다. 증류수 세척이 끝난 후, 이소프로필알콜, 아세톤, 메탄올의 용제로 초음파 세척하고 건조시킨 후, 플라즈마 세정기로 이송시켜, 산소 플라즈마를 이용하여 상기 기판을 5 분간 세정한 후 진공 증착기로 기판을 이송시켰다.

[0191] 이렇게 준비된 ITO 투명 전극 위에 정공주입층으로 2-TNATA (4,4',4"-Tris[2-naphthyl(phenyl)amino]triphenylamine)를 500Å 진공증착 후, 정공전달층으로 a-NPD (N,N'-Di(1-naphthyl)-N,N'-diphenyl-(1,1'-biphenyl)-4,4'-diamine) 300Å 진공 증착한 후, AND (9,10-Di(2-naphthyl)anthracene)과 도판트 DPAP-DPPA (6-(4-(diphenylamino)phenyl)-N,N-diphenylpyren-1-amine) 또는 표 3에 기재된 대로 실시예의 물질을 5% 도핑하여 300Å의 두께로 진공 증착하였으며, 정공저지층 및 정공전달층으로 TPBi (1,3,5-tris(N-phenylbenzimidizol-2-yl)benzene) 물질을 400Å의 두께로 진공증착 하였으며, 순차적으로 LiF 5Å과 Al(알루미늄) 2000Å 증착하여 음극을 형성하였다. 상기의 과정에서 유기물의 증착속도는 1 Å/sec를 유지하였고, LiF 는 0.2 Å/sec, 알루미늄은 3~7Å/sec의 증착속도를 유지하였다.



[0193]

[0194] 상기에서 제조된 유기 발광 소자에 대한 전기적 발광특성을 하기 [표 8]에 나타내었다.

표 8

[0195]

	전류밀도 (mA/cm^2)	색상	효율 (cd/A)	수명 (hrs)
비교실험예 (DPAP-DPPA)	20	청색	4.6	3,100
H-1	20	청색	6.7	6,600
H-2	20	청색	6.5	7,400
H-3	20	청색	6.8	7,500
H-6	20	청색	6.6	6,500
H-7	20	청색	7.6	7,200
H-27	20	청색	6.9	6,400
H-28	20	청색	7.4	7,300
H-29	20	청색	6.7	6,100
H-32	20	청색	6.5	6,600
H-33	20	청색	6.8	5,500
H-40	20	청색	7.0	5,300
H-41	20	청색	6.7	5,400
H-53	20	청색	7.2	7,100

[0196] 상기 표 8의 결과로부터, 본 발명에 따른 유기전자소자용 화합물은 청색의 역할에서 발광 효율 및 수명 특성이 향상됨을 확인할 수 있었다.

[0197] 이상에서와 같이, 본 기재에 의하면, 비대칭형 구조의 구조를 제공하여 성능이 우수한 유기전자소자용 화합물, 이를 포함하는 유기전자소자 및 유기전자소자를 포함하는 표시장치를 제공할 수 있다.

[0198] 앞에서, 본 발명의 특정한 실시예가 설명되고 도시되었지만 본 발명은 기재된 실시예에 한정되는 것이 아니고, 본 발명의 사상 및 범위를 벗어나지 않고 다양하게 수정 및 변형할 수 있음은 이 기술의 분야에서 통상의 지식을 가진 자에게 자명한 일이다. 따라서, 그러한 수정예 또는 변형예들은 본 발명의 기술적 사상이나 관점으로부터 개별적으로 이해되어서는 안되며, 변형된 실시예들은 본 발명의 특허청구범위에 속한다 하여야 할 것이다.

专利名称(译)	用于有机发光二极管的化合物，具有该化合物的有机发光二极管以及具有有机发光二极管的显示装置		
公开(公告)号	KR1020200005823A	公开(公告)日	2020-01-17
申请号	KR1020180079282	申请日	2018-07-09
申请(专利权)人(译)	（株）鼻子的尺寸		
[标]发明人	조재형 최돈수		
发明人	조재형 최돈수		
IPC分类号	H01L51/00 H01L51/50		
CPC分类号	H01L51/0071 H01L51/0072 H01L51/50		
代理人(译)	Choehoseok		
其他公开文献	KR102118875B1		
外部链接	Espacenet		

摘要(译)

本发明涉及由化学式1表示的用于有机电子装置的化合物，包括该化合物的有机电子装置以及包括该有机电子装置的显示装置，并且化学式1的细节如说明书中所定义。