(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 339 660 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
30.05.2012 Bulletin 2012/22

(43) Date of publication A2:
29.06.2011 Bulletin 2011/26

(21) Application number: **11159565.8**

(22) Date of filing: **16.05.2006**

(51) Int Cl.:
H01L 51/50 *(2006.01)* ***C09K 11/06*** *(2006.01)*
C07D 213/44 *(2006.01)* ***C07D 401/14*** *(2006.01)*

(84) Designated Contracting States:
DE

(30) Priority: **17.05.2005 JP 2005143569**
27.04.2006 JP 2006124450

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:
06746472.7 / 1 885 008

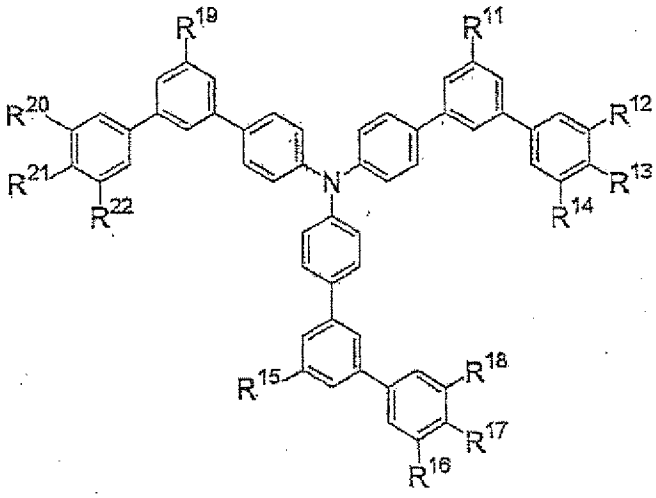
(71) Applicant: **Mitsubishi Chemical Corporation**
Tokyo 108-0014 (JP)

(72) Inventors:
- **Yabe, Masayoshi**
  Yokohama-shi Kanagawa 227-8502 (JP)
- **Fugono, Masayo**
  Yokohama-shi Kanagawa 227-8502 (JP)
- **Iida, Koichiro**
  Yokohama-shi Kanagawa 227-8502 (JP)
- **Takeuchi, Masako**
  Yokohama-shi Kanagawa 227-8502 (JP)
- **Ogata, Tomoyuki**
  Yokohama-shi Kanagawa 227-8502 (JP)

(74) Representative: **Vossius & Partner**
Siebertstrasse 4
81675 München (DE)

(54) Monoamine compound, charge transporting material and organic electroluminescent device

(57) The present invention relates to a monoamine compound represented by the following formula (II) :

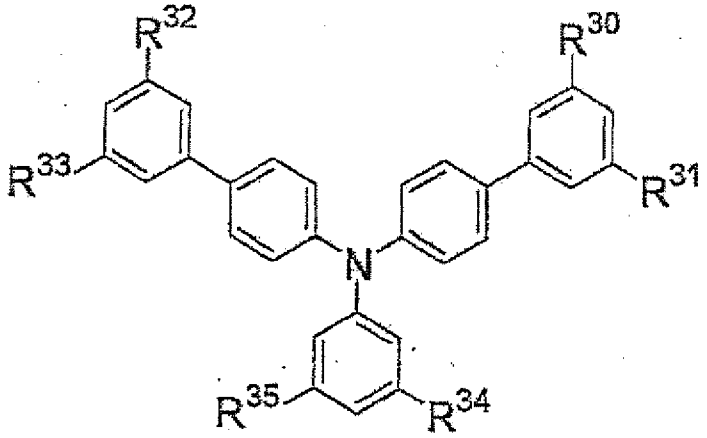


(II)

wherein R^{11} to R^{22} represent a hydrogen atom, an aryl group, or an alkyl group; R^{11} to R^{22} may be the same or different from each other; provided that any one of R^{11} to R^{22} is an aryl group or an alkyl group; R^{11} to R^{22} may further have an aryl group or an alkyl group as a substituent in the case where R^{11} to R^{22} are an aryl group or an alkyl group; and R^{11}

EP 2 339 660 A3

to R^{22} may be combined with an adjacent substituent to form a ring and to a monoamine compound represented by the following formula (III):



(III)

wherein R^{30} to R^{35} represent a hydrogen atom, an aryl group, or an alkyl group; R^{30} to R^{35} may be the same or different from each other; provided that any one of R^{30} to R^{35} is an aryl group or an alkyl group; R^{30} to R^{35} may further have an aryl group or an alkyl group as a substituent in the case where R^{30} to R^{35} are an aryl group or an alkyl group; and R^{30} to R^{35} may be combined with an adjacent substituent to form a ring.

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 11 15 9565

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2004/058195 A1 (KITA HIROSHI [JP] ET AL) 25 March 2004 (2004-03-25) * examples 9-2; compounds A-1 - A-30 * -----	1,2,5,6	INV. H01L51/50 C09K11/06 C07D213/44
X	JP 2001 316338 A (SHIROTA YASUHIKO) 13 November 2001 (2001-11-13) * paragraph [0040]; compounds m-TTA * -----	1,2,5,6	C07D401/14
X	US 4 937 165 A (ONG BENG S [CA] ET AL) 26 June 1990 (1990-06-26) * compound XI * -----	3-6	
X	US 4 869 988 A (ONG BENG S [CA] ET AL) 26 September 1989 (1989-09-26) * compound Ib * -----	3-6	

TECHNICAL FIELDS SEARCHED (IPC)

H01L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	18 April 2012	Wolfbauer, Georg

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

4

EPO FORM 1503 03.82 (P04C01)

Europäisches Patentamt
European Patent Office
Office européen des brevets

Application Number
EP 11 15 9565

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

Europäisches Patentamt
European Patent Office
Office européen des brevets

LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 11 15 9565

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1, 2(completely); 5, 6(partially)

A triarylamine compound according to formula (II)

---

2. claims: 3, 4(completely); 5, 6(partially)

A triarylamine compound according to formula (III)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 11 15 9565

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

18-04-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2004058195 A1	25-03-2004	US 2004058195 A1	25-03-2004
		US 2004062951 A1	01-04-2004
		US 2004072019 A1	15-04-2004
		US 2004096696 A1	20-05-2004
JP 2001316338 A	13-11-2001	NONE	
US 4937165 A	26-06-1990	NONE	
US 4869988 A	26-09-1989	NONE	

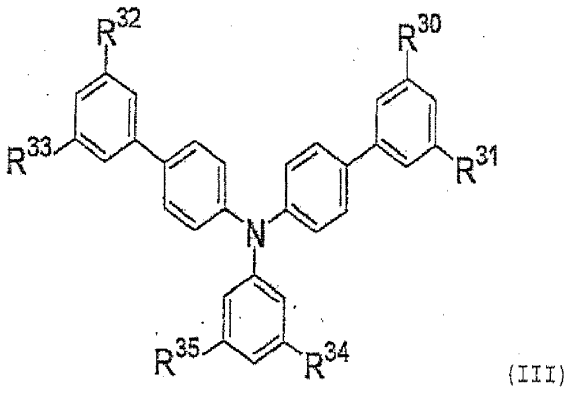
EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

专利名称(译)	单胺化合物，电荷传输材料和有机电致发光器件		
公开(公告)号	EP2339660A3	公开(公告)日	2012-05-30
申请号	EP2011159565	申请日	2006-05-16
[标]申请(专利权)人(译)	三菱化学株式会社		
申请(专利权)人(译)	三菱化学公司		
当前申请(专利权)人(译)	三菱化学公司		
[标]发明人	YABE MASAYOSHI FUGONO MASAYO IIDA KOICHIRO TAKEUCHI MASAKO OGATA TOMOYUKI		
发明人	YABE, MASAYOSHI FUGONO, MASAYO IIDA, KOICHIRO TAKEUCHI, MASAKO OGATA, TOMOYUKI		
IPC分类号	H01L51/50 C09K11/06 C07D213/44 C07D401/14		
CPC分类号	H01L51/0059 C07C211/54 C09K11/06 C09K2211/1007 C09K2211/1014 C09K2211/1029 C09K2211/1037 C09K2211/1044 C09K2211/1059 C09K2211/1092 C09K2211/185 C09K2211/186 H01L51/0035 H01L51/0052 H01L51/0058 H01L51/006 H01L51/0067 H01L51/0071 H01L51/0072 H01L51/008 H01L51/0081 H01L51/0085 H01L51/0095 H01L51/50 H01L51/5016 H01L51/5048 H01L2251/308 H05B33/14 Y10S428/917		
代理机构(译)	法思博事务所		
优先权	2006124450 2006-04-27 JP 2005143569 2005-05-17 JP		
其他公开文献	EP2339660A2		
外部链接	Espacenet		

摘要(译)

本发明涉及下述通式（II）表示的单胺化合物：式中，R 11~R 22表示氢原子，芳基或烷基。 R11至R22可以彼此相同或不同;条件是R11至R22中的任何一个是芳基或烷基;在R11至R22为芳基或烷基的情况下，R11至R22可进一步具有芳基或烷基作为取代基; R11至R22可以与相邻的取代基组合形成环和由下式（III）表示的单胺化合物：其中R30至R35代表氢原子，芳基或烷基; R30至R35可以彼此相同或不同;条件是R30至R35中的任何一个是芳基或烷基;在R30至R35为芳基或烷基的情况下，R30至R35可进一步具有芳基或烷基作为取代基; R30至R35可以与相邻的取代基结合形成环。



(III)