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(11) **EP 1 026 222 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:  
**06.09.2000 Bulletin 2000/36**

(51) Int. Cl.<sup>7</sup>: **C09K 11/06**, H05B 33/14,  
C07F 5/05

(43) Date of publication A2:  
**09.08.2000 Bulletin 2000/32**

(21) Application number: **00102058.5**

(22) Date of filing: **02.02.2000**

(84) Designated Contracting States:  
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
MC NL PT SE**  
Designated Extension States:  
**AL LT LV MK RO SI**

(30) Priority: **04.02.1999 JP 2746899**  
**22.06.1999 JP 17498799**  
**29.07.1999 JP 21471299**

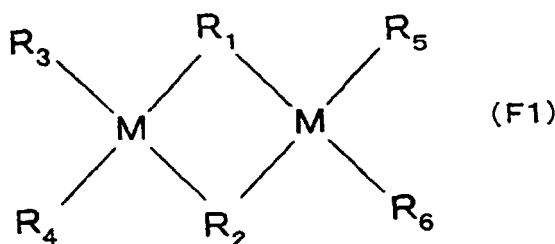
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(54) **Organic material for electroluminescent device and electroluminescent device using the same**

(57) A new organic material for an electroluminescent device suitable for an electroluminescent device and an electroluminescent device using the same. The organic material uses a complex compound expressed by the following formula (F1):



wherein R1 and R2, which can be same or different, respectively denote one selected from the group consisting of halogen, alkyl having 1 to 3 carbon atoms, and a bridging ligand having a nitrogen-containing aromatic ring containing at least two nitrogen atoms, and when R1 or R2 is a bridging ligand having a nitrogen-containing aromatic ring, nitrogen in the nitrogen-containing aromatic ring is a coordinating atom; R3, R4, R5 and R6, which can be same or different, respectively denote one member selected from the group consisting of hydrogen, alkyl, aryl, an aryl derivative, a nitrogen-containing aromatic ring and a derivative of a nitrogen-containing aromatic ring; and M is a central metal.

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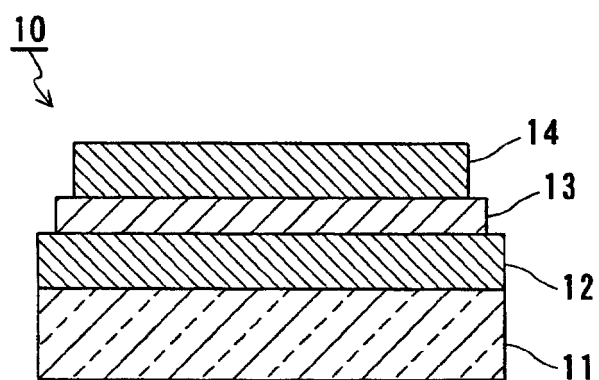


Fig.1



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# EUROPEAN SEARCH REPORT

Application Number  
EP 00 10 2058

| DOCUMENTS CONSIDERED TO BE RELEVANT   |   |  |  |
|---|---|--|--|
| Category  | Citation of document with indication, where appropriate, of relevant passages   | Relevant to claim                                      | CLASSIFICATION OF THE APPLICATION (Int.Cl.7) |
| X   | US 3 681 381 A (TROFIMENKO SWIATOSLAW)<br>1 August 1972 (1972-08-01)<br>* examples 3-5 *  | 1-3  | C09K11/06<br>H05B33/14<br>C07F5/05           |
| X   | LEFFLER, JOHN E. ET AL: "Triarylboron anion radicals and the reductive cleavage of boron compounds"<br>J. AMER. CHEM. SOC. (1970), 92(23), 6825-30, XP002139918<br>* page 6829, column 2, paragraph 4 * | 4,5  |  |
| A   | US 5 683 823 A (SHI JIANMIN ET AL)<br>4 November 1997 (1997-11-04)<br>* column 7 - column 11; example 3 *   | 1-3,6-26   |  |
| A   | WO 98 36035 A (UNIV KINGSTON)<br>20 August 1998 (1998-08-20)<br>* page 2, line 28 *<br>* page 4, line 14 - line 30 *  | 1-3,6-26   |  |
|   |   |  | TECHNICAL FIELDS SEARCHED (Int.Cl.7)         |
|   |   |  | C09K<br>H05B<br>C07F                         |
| The present search report has been drawn up for all claims  |   |  |  |
| Place of search<br><b>THE HAGUE</b>   |   | Date of completion of the search<br><b>9 June 2000</b> | Examiner<br><b>Shade, M</b>                  |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone<br/>Y : particularly relevant if combined with another document of the same category<br/>A : technological background<br/>O : non-written disclosure<br/>P : intermediate document</p> <p>T : theory or principle underlying the invention<br/>E : earlier patent document, but published on, or after the filing date<br/>D : document cited in the application<br/>L : document cited for other reasons<br/>&amp; : member of the same patent family, corresponding document</p> |   |  |  |

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**LACK OF UNITY OF INVENTION  
SHEET B**

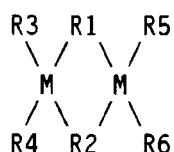
Application Number

EP 00 10 2058

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: 1-3, 6-26**

An organic material and an electroluminescent device comprising such a material where said material is expressed by the formula:



Wherein R1 and R2, which can be the same or different, denote one selected from the group consisting of halogen, alkyl group having 1-3 carbon atoms and bridging ligand containing at least two nitrogen atoms; R3, R4, R5 and R6 are selected from the group consisting of hydrogen, alkyl, aryl, aryl derivative, nitrogen-containing aromatic ring and a derivative of a nitrogen containing aromatic ring; and M is a metal atom.

**2. Claims: 4, 5**

An organic boron complex having an electron accepting phenyl group as a ligand



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Application Number  
EP 00 10 2058

### CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims 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 the first ten claims.

### 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:

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 10 2058

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  
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09-06-2000

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s)   | Publication<br>date      |
|---|---------------------|------------------------------|--------------------------|
| US 3681381 A                              | 01-08-1972          | NONE                         |                          |
| US 5683823 A                              | 04-11-1997          | EP 0786925 A<br>JP 9208946 A | 30-07-1997<br>12-08-1997 |
| WO 9836035 A                              | 20-08-1998          | AU 5978098 A                 | 08-09-1998               |

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)        | 用于电致发光器件的有机材料和使用其的电致发光器件   |         |            |
| 公开(公告)号        | <a href="#">EP1026222A3</a>  | 公开(公告)日 | 2000-09-06 |
| 申请号            | EP2000102058   | 申请日     | 2000-02-02 |
| [标]申请(专利权)人(译) | 松下电器产业株式会社   |         |            |
| 申请(专利权)人(译)    | 松下电器产业有限公司.  |         |            |
| 当前申请(专利权)人(译)  | 松下电器产业有限公司.  |         |            |
| [标]发明人         | MATSUO MIKIKO<br>KISHIMOTO YOSHIO<br>SATO TETSUYA<br>HISADA HITOSHI<br>SUGIURA HISANORI      |         |            |
| 发明人            | MATSUO, MIKIKO<br>KISHIMOTO, YOSHIO<br>SATO, TETSUYA<br>HISADA, HITOSHI<br>SUGIURA, HISANORI |         |            |
| IPC分类号         | C09K11/06 H01L51/30 H01L51/50 H05B33/14 C07F5/05   |         |            |
| CPC分类号         | H05B33/14 C09K11/06 H01L51/0059 H01L51/0079 H01L51/5012 Y10S428/917                          |         |            |
| 优先权            | 1999174987 1999-06-22 JP<br>1999027468 1999-02-04 JP<br>1999214712 1999-07-29 JP             |         |            |
| 其他公开文献         | EP1026222A2<br>EP1026222B1   |         |            |
| 外部链接           | <a href="#">Espacenet</a>  |         |            |

# 摘要(译)

一种适用于电致发光器件的电致发光器件的新型有机材料和使用该材料的电致发光器件。有机材料使用由下式 ( F1 ) 表示的络合物：其中R1和R2可以相同或不同，分别表示选自卤素，具有1-3个碳原子的烷基和桥连中的一种。具有含氮至少两个氮原子的含氮芳环的配体，当R1或R2为具有含氮芳环的桥连配体时，含氮芳环中的氮为配位原子；R3，R4，R5和R6可以相同或不同，分别表示选自氢，烷基，芳基，芳基衍生物，含氮芳环和含氮芳香衍生物中的一种。环；M是中心金属。

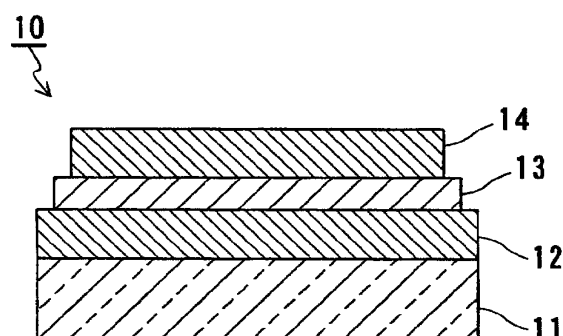


Fig. 1