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

(11) EP 1 345 278 A3

(12) EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
31.05.2006 Bulletin 2006/22

(43) Date of publication A2:
17.09.2003 Bulletin 2003/38

(21) Application number: **02023311.0**

(22) Date of filing: **17.10.2002**

(51) Int Cl.:
H01L 51/00 *(2006.01)*

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

(30) Priority: **15.03.2002 JP 2002071525**

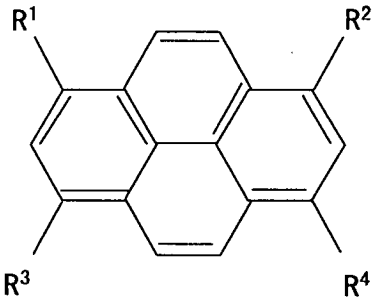
(71) Applicant: **FUJITSU LIMITED**
Kawasaki-shi,
Kanagawa 211-8588 (JP)

(72) Inventors:
- **Sotoyama, Wataru,**
  c/o Fujitsu Ltd.
  Kawasaki-shi,
  Kanagawa 211-8588 (JP)
- **Matsuura, Azuma,**
  c/o Fujitsu Ltd.
  Kawasaki-shi,
  Kanagawa 211-8588 (JP)
- **Sato, Hiroyuki,**
  c/o Fujitsu Ltd.
  Kawasaki-shi,
  Kanagawa 211-8588 (JP)
- **Narusawa, Toshiaki,**
  c/o Fujitsu Ltd.
  Kawasaki-shi,
  Kanagawa 211-8588 (JP)

(74) Representative: **Körfer, Thomas et al**
Mitscherlich & Partner,
Patent- und Rechtsanwälte,
Sonnenstrasse 33
80331 München (DE)

(54) Organic EL element and organic EL display

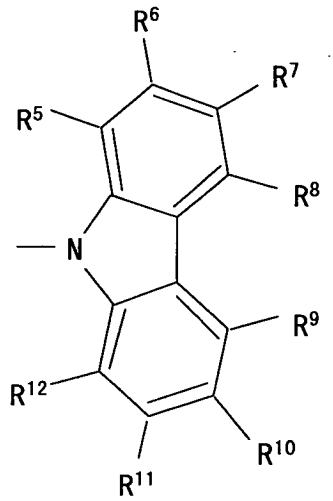
(57) An organic EL element having excellent light-emitting efficiency, light-emitting luminance and color purity of blue light is provided. The organic EL element has an organic thin film layer interposed between a positive electrode and a negative electrode, and contains a 1, 3, 6, 8-tetrasubstituted pyrene compound expressed by the following structural formula (1) as a light-emitting material.



Structural formula (1)

EP 1 345 278 A3

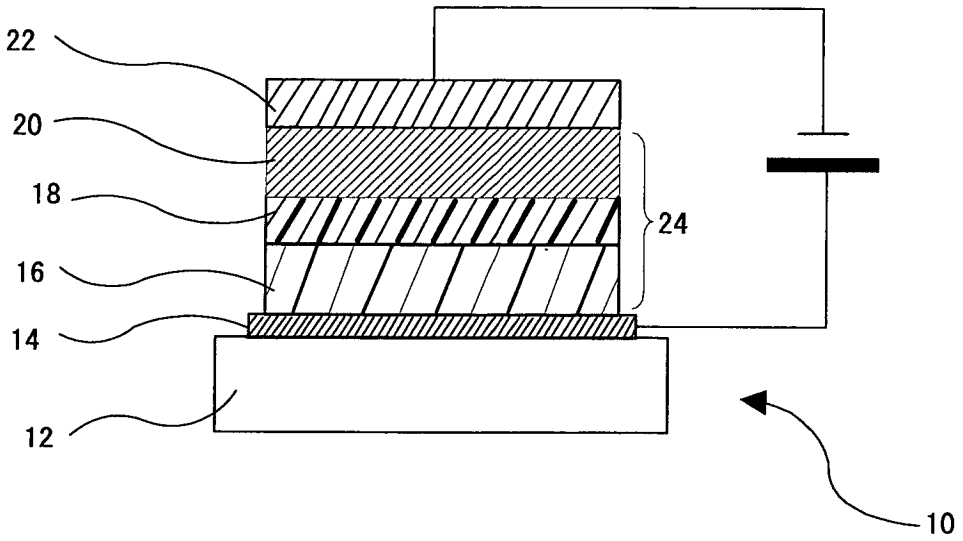
In the structural formula, R^1 to R^4 may be identical or different, and represent substituent groups expressed by the following formula.



Structural formula (2)

In the structural formula (2), R^5 to R^{12} may be identical or different, and represent a hydrogen atom or substituent group. It is preferred that all of R^5 to R^{12} are hydrogen atoms.

Fig. 1



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 02 3311

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 0 965 629 A (TOYO INK MFG. CO., LTD) 22 December 1999 (1999-12-22) * page 16; compounds 39,40 *	1	INV. H01L51/00
A	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 09, 13 October 2000 (2000-10-13) & JP 2000 164363 A (IDEMITSU KOSAN CO LTD), 16 June 2000 (2000-06-16) * abstract; compound 19 *		
A	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 21, 3 August 2001 (2001-08-03) & JP 2001 118682 A (FUJITSU LTD), 27 April 2001 (2001-04-27) * abstract; figure 5 *		
A	JUSTIN THOMAS K R ET AL: "NOVEL GREEN LIGHT-EMITTING CARBAZOLE DERIVATIVES: POTENTIAL ELECTROLUMINESCENT MATERIALS" ADVANCED MATERIALS, WILEY VCH, WEINHEIM, DE, vol. 12, no. 24, 15 December 2000 (2000-12-15), pages 1949-1951, XP000977841 ISSN: 0935-9648 * the whole document *		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	7 April 2006	Königstein, C

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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 02 02 3311

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.

07-04-2006

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0965629 A	22-12-1999	DE 69904879 D1	20-02-2003
		DE 69904879 T2	07-08-2003
		US 6329084 B1	11-12-2001
JP 2000164363 A	16-06-2000	NONE	
JP 2001118682 A	27-04-2001	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)	有机EL元件和有机EL显示器		
公开(公告)号	EP1345278A3	公开(公告)日	2006-05-31
申请号	EP2002023311	申请日	2002-10-17
[标]申请(专利权)人(译)	富士通株式会社		
申请(专利权)人(译)	FUJITSU LIMITED		
当前申请(专利权)人(译)	富士胶片株式会社		
发明人	SOTOYAMA, WATARU, C/O FUJITSU LTD. MATSUURA, AZUMA, C/O FUJITSU LTD. SATO, HIROYUKI, C/O FUJITSU LTD. NARUSAWA, TOSHIAKI, C/O FUJITSU LTD.		
IPC分类号	H01L51/00 H01L51/50 C09K11/06 H01L51/30		
CPC分类号	H01L51/0072 H01L51/0054 H01L51/0059 H01L51/006 H01L51/0067 H01L51/007 H01L51/5012 H01L51/5048 Y10S428/917		
优先权	2002071525 2002-03-15 JP		
其他公开文献	EP1345278B1 EP1345278A2		
外部链接	Espacenet		

摘要(译)

提供一种具有优异的发光效率，发光亮度和蓝光色纯度的有机EL元件。有机EL元件具有介于正极和负极之间的有机薄膜层，并含有由下列结构式（1）表示的1,3,6,8-四取代的芘化合物作为发光材料。在结构式中，R 1至R 4可以相同或不同，并且表示由下式表示的取代基。在结构式（2）中，R 5至R 12可以相同或不同，并且表示氢原子或取代基。优选R5至R12全部为氢原子。

Fig. 1