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(54) **White light-emitting oled device having a blue light-emitting layer doped with an electron-transporting or a hole-transporting material or both**

(57) An organic light-emitting diode (OLED) device which produces substantially white light includes an anode; a hole-transporting layer disposed over the anode; and a blue light-emitting layer having a host doped with a blue light-emitting compound disposed directly on the hole-transporting layer and the blue light-emitting layer being doped with an electron-transporting or a hole-transporting material or both selected to improve efficiency and operational stability. The device also includes an electron-transporting layer disposed over the blue light-emitting layer; a cathode disposed over the electron-transporting layer; and the hole-transporting layer or electron-transporting layer, or both the hole-transporting layer and electron-transporting layer, being selectively doped with a compound which emits light in the yellow region of the spectrum which corresponds to an entire layer or a partial portion of a layer in contact with the blue light-emitting layer.

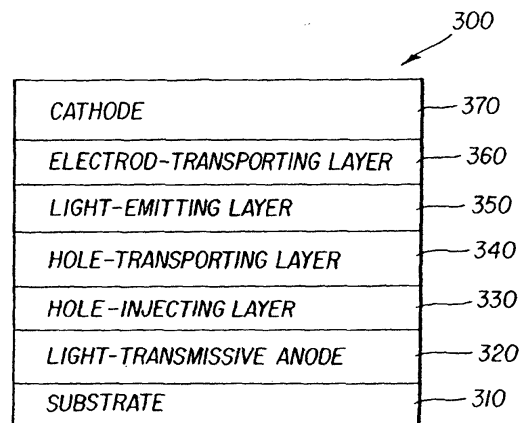


FIG. 3



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 07 6759

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	EP 1 286 569 A (EASTMAN KODAK CO) 26 February 2003 (2003-02-26) * paragraph [0032] - paragraph [0042] * * claims 1-10 * * the whole document *	1-10	H01L27/00 H01L51/30 C09K11/06 H01L51/50
X	EP 1 187 235 A (EASTMAN KODAK CO) 13 March 2002 (2002-03-13) * paragraph [0035] - paragraph [0039] * * table 5 * * figure 5 * * claims 1-10 * * the whole document *	1-10	
A,D	EP 0 786 925 A (EASTMAN KODAK CO) 30 July 1997 (1997-07-30) * abstract *	1	
A,D	EP 0 643 549 A (EASTMAN KODAK CO) 15 March 1995 (1995-03-15) * abstract *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			H01L C09K
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		29 September 2004	Bader, K
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)

**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:

1-10



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: 1-10

The OLED device of claim 1, wherein the yellow light emitting compound is Rubrene.

2. claims: 1-10

The OLED device of claim 1, wherein at least one substituent is alkyl with 1-24 carbon atoms.

3. claims: 1-10

The OLED device of claim 1, wherein at least one substituent R1-R6 is selected from group 2.

4. claims: 1-10

The OLED device of claim 1, wherein at least one substituent R1-R6 is selected from group 3.

5. claims: 1-10

The OLED device of claim 1, wherein at least one substituent R1-R6 is selected from group 4.

6. claims: 1-10

The OLED device of claim 1, wherein at least one substituent R1-R6 is selected from group 5.

7. claims: 1-10

The OLED device of claim 1, wherein at least one substituent R1-R6 is selected from group 6.

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

EP 04 07 6759

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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29-09-2004

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专利名称(译)	白色发光橡胶装置，其具有掺杂有电子传输材料或空穴传输材料或两者的蓝色发光层		
公开(公告)号	EP1492167A3	公开(公告)日	2005-01-26
申请号	EP2004076759	申请日	2004-06-14
[标]申请(专利权)人(译)	伊斯曼柯达公司		
申请(专利权)人(译)	伊士曼柯达公司		
当前申请(专利权)人(译)	伊士曼柯达公司		
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IPC分类号	H01L51/50 C09K11/06 H01L27/00 H01L33/00 H01L51/00 H01L51/30 H05B33/00 H05B33/14 H05B33/22		
CPC分类号	C09K11/06 C09K2211/1011 C09K2211/1029 C09K2211/107 H01L51/0052 H01L51/0059 H01L51/0062 H01L51/008 H01L51/0081 H01L51/504 H01L51/5064 Y02B20/181 Y10S428/917		
优先权	10/606446 2003-06-26 US		
其他公开文献	EP1492167A2		
外部链接	Espacenet		

摘要(译)

产生基本上白光的有机发光二极管 (OLED) 器件包括阳极;空穴传输层设置在阳极上;蓝色发光层, 其具有掺杂有蓝色发光化合物的主体, 所述蓝色发光化合物直接设置在所述空穴传输层上, 并且所述蓝色发光层掺杂有电子传输或空穴传输材料或两者选自提高效率 and 运营稳定性。该器件还包括设置在蓝色发光层上的电子传输层;阴极设置在电子传输层上;空穴传输层或电子传输层, 或者空穴传输层和电子传输层两者, 选择性地掺杂有光谱的黄色区域发光的化合物, 该黄色区域对应于整个层或部分层与蓝色发光层接触的层的一部分。

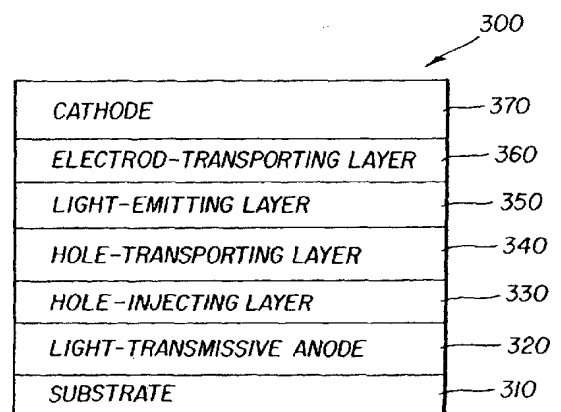


FIG. 3