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(54) Organic light emitting full color display panel

(57) An article comprising an organic light emitting full color display panel is described. In the article, red, green and blue dopants are simultaneously deposited in a host layer such that the blue dopant is deposited on a blue sub-pixel and at least one of a red and green sub-pixel, and the red and green dopants emit light through electroluminescence.

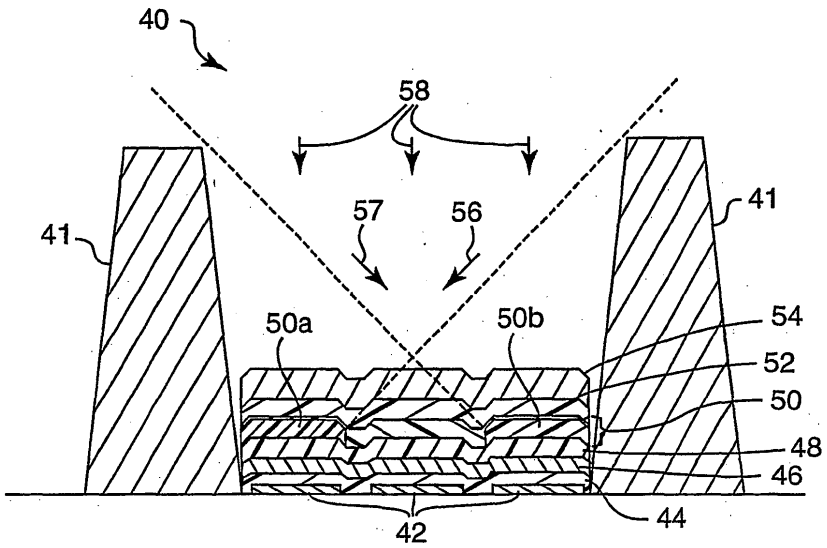

FIG. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 06 02 5156

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 Y	US 6 224 448 B1 (UTSUGI KOJI ET AL) 1 May 2001 (2001-05-01) * column 3, line 47 - line 53 * * column 5, line 6 - line 45 * * column 7, line 4 - line 43 * * figures 2,4B * -----	1,4,5, 8-10 2,3,6,7	INV. H01L27/32 H01L51/50
Y	MATTOUSSI HEDI ET AL: "Photoluminescence quantum yield of pure and molecularly doped organic solid films" JOURNAL OF APPLIED PHYSICS, AMERICAN INSTITUTE OF PHYSICS. NEW YORK, US, vol. 86, no. 5, 1 September 1999 (1999-09-01), pages 2642-2650, XP012048541 ISSN: 0021-8979 * abstract * -----	2,3	
Y	JP 07 142169 A (MITSUBISHI CHEM CORP) 2 June 1995 (1995-06-02) * abstract * -----	2,3	TECHNICAL FIELDS SEARCHED (IPC)
Y	JP 10 284251 A (MITSUBISHI CHEM CORP) 23 October 1998 (1998-10-23) * abstract * -----	2,3	H01L H05B
X Y	EP 0 550 062 A2 (EASTMAN KODAK CO [US] EASTMAN KODAK CO [DE]) 7 July 1993 (1993-07-07) * page 4, line 53 - page 33, line 27; figures 1-18 * -----	9,10 6,7	
X A	EP 1 003 221 A (EASTMAN KODAK CO) 24 May 2000 (2000-05-24) * paragraph [0020] - paragraph [0032]; figures 2-6 * ----- -/--	9,10 1	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	26 March 2008	Bernabé Prieto, A

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)

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EUROPEAN SEARCH REPORT

Application Number
EP 06 02 5156

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	PATENT ABSTRACTS OF JAPAN vol. 1999, no. 03, 31 March 1999 (1999-03-31) -& JP 10 319870 A (NEC CORP), 4 December 1998 (1998-12-04) * abstract *		
P,A	-& US 6 255 775 B1 (ISHII IKUKO ET AL) 3 July 2001 (2001-07-03)		
X	JP 10 223371 A (NIPPON ELECTRIC CO) 21 August 1998 (1998-08-21) * abstract; figure 4 *	9,10	
P,X	WO 01/80319 A (EMAGIN CORP [US]; GHOSH AMALKUMAR P [US]; ZHANG RONG [US]; MACDONALD E) 25 October 2001 (2001-10-25) * page 8, line 1 - page 13, line 2; figures 2-11 *	9	
A	GB 2 347 017 A (FUTABA DENSHI KOGYO KK [JP]) 23 August 2000 (2000-08-23) * page 9, paragraph 2 - page 15, paragraph 1; figures 3,4b *	9,10	

TECHNICAL FIELDS SEARCHED (IPC)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	26 March 2008	Bernabé Prieto, A

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European Patent Office

Application Number
EP 06 02 5156

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:

☐ 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).

European Patent Office

LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 06 02 5156

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: 1-8

A method of making an oled display and resulting display having organic light emitting pixels having red, green, and blue subpixels comprising: for each pixel depositing a hole transporting layer and an electron transporting layer; and depositing red, green, and blue dopants simultaneously in a host layer such that the blue dopant is deposited on the blue subpixel and at least one of the red and green subpixels, and
optionally using a shadow mask during the deposition process.

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2. claims: 9-10

A method of correcting for parallax in the making of an organic light emitting display panel and resulting oled display
comprising using line-of-sight vapor deposition to create a series of adjacent pixels, each pixel comprising sub-pixels, wherein one or more source is positioned at an angle of about 20 deg. to about 70 deg. from the pixel surfaces and wherein a shadow mask is used in the deposition process, the mask having slots defined by ribs wherein the pitch of the ribs is smaller than the pitch of the pixels

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 06 02 5156

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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26-03-2008

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6224448 B1	01-05-2001	NONE	
JP 7142169 A	02-06-1995	JP 3451680 B2	29-09-2003
JP 10284251 A	23-10-1998	JP 3760556 B2	29-03-2006
EP 0550062 A2	07-07-1993	CA 2085318 A1	01-07-1993
		DE 69217470 D1	27-03-1997
		DE 69217470 T2	14-08-1997
		JP 3369615 B2	20-01-2003
		JP 5258859 A	08-10-1993
		US 5294869 A	15-03-1994
EP 1003221 A	24-05-2000	JP 2000155538 A	06-06-2000
		US 2002011785 A1	31-01-2002
JP 10319870 A	04-12-1998	US 6255775 B1	03-07-2001
US 6255775 B1	03-07-2001	JP 10319870 A	04-12-1998
JP 10223371 A	21-08-1998	JP 2833605 B2	09-12-1998
WO 0180319 A	25-10-2001	AU 5347201 A	30-10-2001
GB 2347017 A	23-08-2000	JP 3641963 B2	27-04-2005
		JP 2000235894 A	29-08-2000
		KR 20000058036 A	25-09-2000
		US 6414432 B1	02-07-2002

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)	有机发光全彩显示屏		
公开(公告)号	EP1768184A3	公开(公告)日	2008-04-30
申请号	EP2006025156	申请日	2002-04-05
[标]申请(专利权)人(译)	明尼苏达州采矿制造公司		
申请(专利权)人(译)	3M创新有限公司		
当前申请(专利权)人(译)	3M创新有限公司		
发明人	HAASE, MICHAEL A. C/O 3M INNOVATIVE PROP. CO. BAUDE, PAUL F. C/O 3M INNOVATIVE PROP. CO. WILLIAMS, ROBERT C. C/O INNOVATIVE PROP. COMP.		
IPC分类号	H01L27/32 H01L51/50 H05B33/10 B05C11/11 B05D5/12 C23C14/04 C23C14/12 C23C14/22 C23C16/00 H01L51/40 H01L51/56		
CPC分类号	H01L51/0011 C23C14/042 C23C14/12 C23C14/225 H01L27/3211 H01L27/3295 H01L51/001 H01L51/5036 H01L51/56		
代理机构(译)	法思博事务所		
优先权	09/886447 2001-06-21 US		
其他公开文献	EP1768184A2		
外部链接	Espacenet		

摘要(译)

描述了包括有机发光全色显示板的制品。在该文章中，红色，绿色和蓝色掺杂剂同时沉积在主体层中，使得蓝色掺杂剂沉积在蓝色子像素和红色和绿色子像素中的至少一个上，并且红色和绿色掺杂剂发射光通过电致发光。

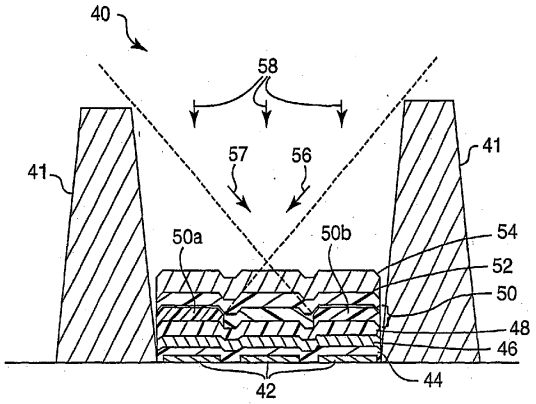

FIG. 2