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(54) **Organic electroluminescent element, display and illuminator**

(57) An organic electroluminescent element comprising an anode; a cathode; at least two light emission layers provided between the anode and the cathode; and at least one intermediate layer provided between the two light emission layers, wherein the two light emission layers each comprise the same host compound A; one of

the two light emission layers comprises light emission dopant A and the other light emission layer comprises light emission dopant B which is different from light emission dopant A; and the intermediate layer comprises host compound A.

EP 2 271 183 A3



EUROPEAN SEARCH REPORT

Application Number
EP 10 18 8489

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 2002/027416 A1 (KIM DONG-HYUN [KR] ET AL) 7 March 2002 (2002-03-07)	1,4-11, 13,14	INV. H05B33/12
Y	* claims 1-3 * * figures 1-3 * * paragraphs [0010], [0012], [0031] - [0033] *	2,3,12	C09K11/06
Y	----- DE 101 50 477 A1 (BAYER AG [DE]) 17 April 2003 (2003-04-17) * paragraph [0012] - paragraph [0016] * * compounds I,IIIa,IVa *	2,3	
A	----- US 2003/040627 A1 (FUJII HIROYUKI [JP]) 27 February 2003 (2003-02-27) * paragraph [0035] - paragraph [0036] * * Chemical Formula 45 *	2,3	
A	----- WO 2004/017043 A2 (UNIV SOUTHERN CALIFORNIA [US]) 26 February 2004 (2004-02-26) * paragraph [0098]; compound 3 * * paragraph [0104] * * paragraph [0008] - paragraph [0011] * * paragraph [0029] *	1-14	TECHNICAL FIELDS SEARCHED (IPC) C09K
A	----- US 2004/086745 A1 (IWAKUMA TOSHIHIRO [JP] ET AL) 6 May 2004 (2004-05-06) * compounds Ir1,Ir5,Ir9 * * paragraph [0066] *	1-14	
Y	----- US 6 687 266 B1 (MA BIN [US] ET AL) 3 February 2004 (2004-02-03) * column 17; compound 8 * * claims 1-8 *	12	
----- -/--			
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 10 January 2011	Examiner Ziegler, Jan
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	

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EPO FORM 1503 03.82 (P04C01)



EUROPEAN SEARCH REPORT

Application Number
EP 10 18 8489

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	WO 02/091814 A (UNIV PRINCETON [US]; UNIV SOUTHERN CALIFORNIA [US]) 21 November 2002 (2002-11-21) * claims 1,2,4-6 * * figure 1 * * page 16, line 6 - line 21 * * page 21, line 30 - page 25, line 14 * -----	1-14		
A	WO 2004/060026 A (SEMICONDUCTOR ENERGY LAB [JP]) 15 July 2004 (2004-07-15) * page 14, line 11 - page 16, line 1 * -----	1-14		
A	JP 2003 272857 A (IDEMITSU KOSAN CO) 26 September 2003 (2003-09-26) * paragraphs [0008], [0012], [0014] * * claims 1,16 * * column 3, line 46 - column 4, line 34 * * column 8, line 46 - column 9, line 46 * * Formulas 2 and 8 * -----	1-14		
A	JP 2002 184574 A (NIPPON SEIKI CO LTD) 28 June 2002 (2002-06-28) * paragraph [0009] * -----	1-14		TECHNICAL FIELDS SEARCHED (IPC)
A	US 2004/091738 A1 (PSAI JUI-YI [US] ET AL TSAI JUI-YI [US] ET AL) 13 May 2004 (2004-05-13) * claims 1-12 * -----	1-14		
A	US 2002/134984 A1 (IGARASHI TATSUYA [JP]) 26 September 2002 (2002-09-26) * compounds 1-2 * * paragraphs [0001], [0005] - [0007], [0011] - [0014], [0020], [0072] * * examples 1-5 * * claims 1,13 * ----- -/--	14		
The present search report has been drawn up for all claims				
Place of search The Hague		Date of completion of the search 10 January 2011	Examiner Ziegler, Jan	
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				

 1
EPO FORM 1503 03.82 (P04C01)



EUROPEAN SEARCH REPORT

Application Number
EP 10 18 8489

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	WO 02/15645 A1 (UNIV PRINCETON [US]; UNIV SOUTHERN CALIFORNIA [US]; UNIVERSAL DISPLAY) 21 February 2002 (2002-02-21) * page 1 - page 7 * * page 24 * * page 42 * * claim 3 * -----	1-14	
			TECHNICAL FIELDS SEARCHED (IPC)
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 10 January 2011	Examiner Ziegler, Jan
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			

 1
EPO FORM 1503 03.82 (P04C01)

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

EP 10 18 8489

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10-01-2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2002027416 A1	07-03-2002	JP 2001313180 A	09-11-2001
		KR 20010092905 A	27-10-2001
DE 10150477 A1	17-04-2003	AT 392017 T	15-04-2008
		CN 1572031 A	26-01-2005
		WO 03034512 A1	24-04-2003
		EP 1438756 A1	21-07-2004
		ES 2303861 T3	01-09-2008
		HK 1073390 A1	31-12-2009
		JP 2005506665 T	03-03-2005
		KR 20050033536 A	12-04-2005
		KR 20100036393 A	07-04-2010
		TW 242036 B	21-10-2005
		US 2003108769 A1	12-06-2003
US 2003040627 A1	27-02-2003	CN 1397559 A	19-02-2003
WO 2004017043 A2	26-02-2004	AU 2003259917 A1	03-03-2004
		CN 1681828 A	12-10-2005
		CN 101172986 A	07-05-2008
		EP 1539773 A2	15-06-2005
		JP 4578970 B2	10-11-2010
		JP 2005535719 T	24-11-2005
		KR 20060011933 A	06-02-2006
US 2004086745 A1	06-05-2004	EP 1489155 A1	22-12-2004
		EP 2169028 A2	31-03-2010
		WO 03080760 A1	02-10-2003
		JP 4316387 B2	19-08-2009
		JP 2009088538 A	23-04-2009
		US 2005249976 A1	10-11-2005
US 6687266 B1	03-02-2004	AU 2003291370 A1	03-06-2004
		CN 1726606 A	25-01-2006
		EP 1561240 A1	10-08-2005
		EP 2259361 A1	08-12-2010
		JP 2006505956 T	16-02-2006
		KR 20050086462 A	30-08-2005
		WO 2004045002 A1	27-05-2004
WO 02091814 A	21-11-2002	AU 2002305548 A1	25-11-2002
		CN 1543659 A	03-11-2004
		EP 1390962 A2	25-02-2004
		EP 2259285 A2	08-12-2010
		JP 4493915 B2	30-06-2010
		JP 2004522276 T	22-07-2004

EPO FORM P0459

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

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

EP 10 18 8489

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.

10-01-2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2004060026 A	15-07-2004	AU 2003289392 A1	22-07-2004
		CN 1729724 A	01-02-2006
		CN 101510589 A	19-08-2009
		EP 1578172 A1	21-09-2005
		JP 4519652 B2	04-08-2010
		KR 20050088221 A	02-09-2005
		KR 20100086509 A	30-07-2010
		US 2006164006 A1	27-07-2006
		US 2009174308 A1	09-07-2009
		US 2005077817 A1	14-04-2005
JP 2003272857 A	26-09-2003	NONE	
JP 2002184574 A	28-06-2002	JP 4415489 B2	17-02-2010
US 2004091738 A1	13-05-2004	AU 2003285162 A1	03-06-2004
		WO 2004045001 A2	27-05-2004
US 2002134984 A1	26-09-2002	JP 3812730 B2	23-08-2006
		JP 2003133074 A	09-05-2003
		US 2005238916 A1	27-10-2005
		US 2008248329 A1	09-10-2008
WO 0215645 A1	21-02-2002	AU 8327401 A	25-02-2002
		CN 1454448 A	05-11-2003
		CN 101924190 A	22-12-2010
		EP 1325671 A1	09-07-2003
		JP 2004506305 T	26-02-2004
		KR 20030041972 A	27-05-2003
		TW 593625 B	21-06-2004
		US 2008281098 A1	13-11-2008
		US 2002182441 A1	05-12-2002

专利名称(译)	有机电致发光元件，显示器和发光器		
公开(公告)号	EP2271183A3	公开(公告)日	2011-02-16
申请号	EP2010188489	申请日	2005-07-13
[标]申请(专利权)人(译)	柯尼卡株式会社		
申请(专利权)人(译)	柯尼卡美能达控股株式会社.		
当前申请(专利权)人(译)	柯尼卡美能达控股株式会社.		
[标]发明人	SUZURI YOSHIYUKI KITA HIROSHI		
发明人	SUZURI, YOSHIYUKI KITA, HIROSHI		
IPC分类号	H05B33/12 C09K11/06		
CPC分类号	C09K11/06 C09K2211/1029 C09K2211/1044 C09K2211/1048 C09K2211/1092 C09K2211/185 H01L51/5016 H01L51/5036 H05B33/14		
优先权	2004215728 2004-07-23 JP		
其他公开文献	EP2271183B1 EP2271183A2		
外部链接	Espacenet		

摘要(译)

一种有机电致发光元件，包括阳极;阴极;在阳极和阴极之间提供至少两个发光层;在两个发光层之间设置至少一个中间层，其中两个发光层各自包含相同的主体化合物A;两个发光层中的一个包括发光掺杂剂A，另一个发光层包括与发光掺杂剂A不同的发光掺杂剂B;中间层包含主体化合物A.

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Y	DE 101 50 477 A1 (BAYER AG [DE]) 17 April 2003 (2003-04-17) * paragraph [0015] - paragraph [0016] * * compounds 1,111a, 11Va *	2,3													
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A	US 2004/086745 A1 (IWAKUMA TOSHIHIRO [JP] ET AL) 6 May 2004 (2004-05-06) * compounds 1r1, 1r5, 1r9 * * paragraph [0066] *	1-14													
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1	<table border="1"> <thead> <tr> <th>Kind of search</th> <th>Date of completion of the search</th> <th>Examiner</th> </tr> </thead> <tbody> <tr> <td>The Hague</td> <td>10 January 2011</td> <td>Ziegler, Jan</td> </tr> </tbody> </table>	Kind of search	Date of completion of the search	Examiner	The Hague	10 January 2011	Ziegler, Jan								
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