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(54) Flat panel display

(57) The present invention discloses an organic light emitting device for preventing element defects and improving picture quality by reducing a taper angle of a substrate surface. The flat panel display of the present invention comprises, an insulating substrate, a lower layer formed on the insulating substrate and having a first step and a first taper angle with respect to the substrate surface, and an upper layer formed on the insulating substrate and for reducing the taper angle of the lower layer. The upper layer has a second taper angle smaller than the first taper angle of the lower layer. The upper layer is a conductive layer that may be applied by a wet coating method, has a charge transporting capability, and is selected from at least one of a small-molecule organic layer including a carbazole-based, arylamine-based, hydrazone-based, stilbene-based, oxadiazole-based, starburst-based derivatives, and a polymer organic layer including PEDOT, PANI, carbazole-based, arylamine-based, perylene-based, pyrrole-based, oxadiazole-based derivatives.

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EP 04 09 0398

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 2002/113248 A1 (YAMAGATA HIROKAZU [JP] ET AL) 22 August 2002 (2002-08-22)	1-6,10, 12-19, 22, 52-55,58	INV. H01L27/00
Y		31-34, 37, 45-48,51	
A		24,38, 59-63	
	* paragraphs [0217] - [0220]; figures 23a,23b *		

X	EP 1 331 667 A (SEMICONDUCTOR ENERGY LAB [JP]) 30 July 2003 (2003-07-30)	1-6,10, 12-22	
A		24,31, 38,45, 52,59	
	* paragraphs [0032], [0038], [4043], [0044], [0054] - [0057], [0091], [0092], [0154]; figures 1C,3B *		
Y		37	TECHNICAL FIELDS SEARCHED (IPC)

X	EP 1 058 311 A (SEMICONDUCTOR ENERGY LAB [JP]) 6 December 2000 (2000-12-06) * paragraphs [0120] - [0125]; figures 5b,5c *	1-6,8	H01L

Y	EP 1 315 209 A (SAMSUNG SDI CO LTD [KR]) 28 May 2003 (2003-05-28) * figures 3,4 *	31-34, 45-48,51	

A	EP 1 063 704 A (SEMICONDUCTOR ENERGY LAB [JP]) 27 December 2000 (2000-12-27) * figure 2 *	1,24,31, 38,45, 52,59	

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	4 July 2007	De Laere, Ann

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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L : document cited for other reasons

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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	US 2003/146695 A1 (SEKI SHUNICHI [JP]) 7 August 2003 (2003-08-07) * paragraphs [0225] - [0227]; figures * -----	1,24,31, 38,45, 52,59	

TECHNICAL FIELDS SEARCHED (IPC)

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The Hague	4 July 2007	De Laere, Ann

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 04 09 0398

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04-07-2007

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2002113248 A1	22-08-2002	CN 1372325 A	02-10-2002
		KR 20020067976 A	24-08-2002
		SG 102681 A1	26-03-2004
		TW 556358 B	01-10-2003
EP 1331667 A	30-07-2003	CN 1434669 A	06-08-2003
		TW 258317 B	11-07-2006
		US 2003227253 A1	11-12-2003
EP 1058311 A	06-12-2000	CN 1278109 A	27-12-2000
		CN 1577016 A	09-02-2005
		CN 1662106 A	31-08-2005
		CN 1808723 A	26-07-2006
		CN 1874026 A	06-12-2006
		KR 20010039643 A	15-05-2001
		KR 20050067370 A	01-07-2005
		KR 20070004467 A	09-01-2007
		KR 20070001846 A	04-01-2007
		TW 457728 B	01-10-2001
EP 1315209 A	28-05-2003	CN 1423513 A	11-06-2003
		JP 2003168569 A	13-06-2003
		KR 20030042937 A	02-06-2003
		US 2003098645 A1	29-05-2003
EP 1063704 A	27-12-2000	CN 1278110 A	27-12-2000
		CN 1606390 A	13-04-2005
		CN 1606391 A	13-04-2005
		CN 1607867 A	20-04-2005
		KR 20010029824 A	16-04-2001
		KR 20050076720 A	26-07-2005
		KR 20050076721 A	26-07-2005
		KR 20050079000 A	08-08-2005
		TW 483287 B	11-04-2002
		US 6452341 B1	17-09-2002
US 2003146695 A1	07-08-2003	CN 1429051 A	09-07-2003
		JP 3705264 B2	12-10-2005
		JP 2003249376 A	05-09-2003
		KR 20030051326 A	25-06-2003
		TW 228018 B	11-02-2005
		US 2005264182 A1	01-12-2005

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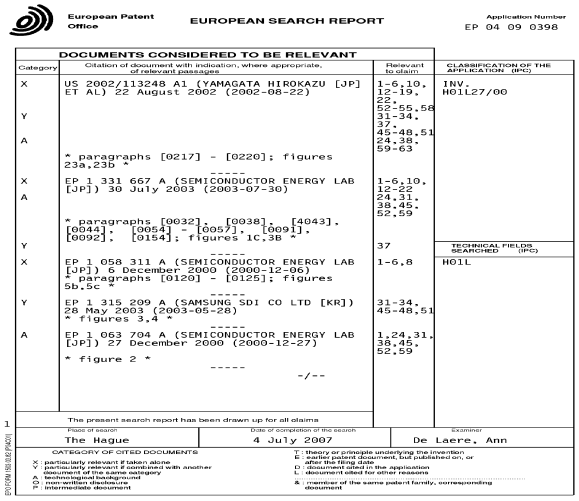
For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

专利名称(译)	平板显示器		
公开(公告)号	EP1536471A3	公开(公告)日	2007-08-15
申请号	EP2004090398	申请日	2004-10-18
[标]申请(专利权)人(译)	三星斯笛爱股份有限公司		
申请(专利权)人(译)	三星SDI CO.，LTD.		
当前申请(专利权)人(译)	三星SDI CO.，LTD.		
发明人	KIM, MU-HYUNG, C/O SAMSUNG SDI CO., LTD. CHIN, BYUNG-DOO, C/O SAMSUNG SDI CO., LTD. WON, SONG-MYUNG, C/O SAMSUNG SDI CO., LTD. LEE, SEONG-TAEK, C/O SAMSUNG SDI CO., LTD.		
IPC分类号	H01L27/00 H05B33/22 C09K11/06 G09F9/30 H01L27/32 H01L51/50 H01L51/52 H05B33/00 H05B33/02 H05B33/12 H05B33/14 H05B33/20		
代理机构(译)	hengelhaupt，Jürgen		
优先权	1020030084746 2003-11-26 KR		
其他公开文献	EP1536471B1 EP1536471A2		
外部链接	Espacenet		

摘要(译)

本发明公开了一种有机发光器件，用于通过减小基板表面的锥角来防止元件缺陷和改善图像质量。本发明的平板显示器包括：绝缘基板，形成在绝缘基板上并具有相对于基板表面的第一台阶和第一锥角的下层，以及形成在绝缘基板上的上层减小下层的锥角。上层具有小于下层的第一锥角的第二锥角。上层是可以通过湿涂法施加的导电层，具有电荷输送能力，并且选自包括基于咔唑，芳基胺，基于腙的小分子有机层中的至少一种。基于二苯乙烯，基于恶二唑，基于星爆的衍生物，以及包括PEDOT，PANI，咔唑基，芳基胺基，per基，吡咯基，恶二唑基衍生物的聚合物有机层。



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