



(11)

EP 3 683 841 A3

(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
29.07.2020 Bulletin 2020/31

(51) Int Cl.: **H01L 27/32** ^(2006.01) **H01L 51/52** ^(2006.01)

(43) Date of publication A2:
22.07.2020 Bulletin 2020/30

(21) Application number: **20150647.4**

(22) Date of filing: 08.01.2020

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
 GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
 PL PT RO RS SE SI SK SM TR**
 Designated Extension States:
BA ME
 Designated Validation States:
KH MA MD TN

(72) Inventors:

- **Park, Hyungjun**
Yongin-si, Gyeonggi-do (KR)
- **Kwak, Wonkyu**
Yongin-si, Gyeonggi-do (KR)
- **Jeong, Jintae**
Yongin-si, Gyeonggi-do (KR)

(74) Representative: **Dr. Weitzel & Partner**
Patent- und Rechtsanwälte mbB
Friedenstrasse 10
89522 Heidenheim (DE)

(30) Priority: 18.01.2019 KR 20190006924
08.05.2019 KR 20190053907

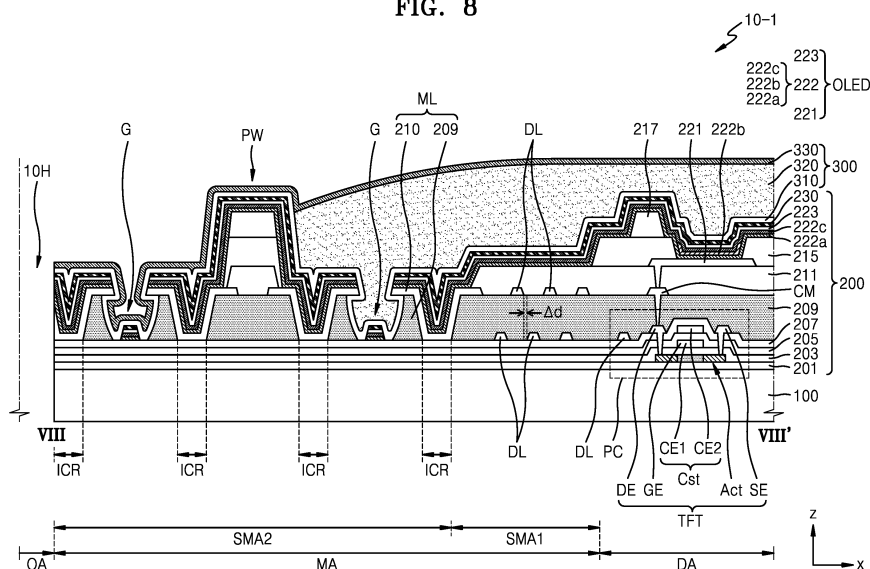
(71) Applicant: **Samsung Display Co., Ltd.**
Gyeonggi-do 17113 (KR)

(54) **DISPLAY PANEL**

(57) A display panel (10-1) includes: a substrate (100) including a first region (OA), a second region (DA), and a third region (MA) between the first region (OA) and the second region (DA); a display element (OLED) located in the second region (DA) and including a pixel electrode (221), an opposite electrode (223), and an intermediate layer (222); a multi-layered film (ML) arranged between the substrate (100) and the pixel electrode (221)

and including an organic insulating layer (209) and an inorganic layer (210) on the organic insulating layer; and at least one groove (G) formed in the multi-layered film and located in the third region (MA), wherein at least one organic material layer (222a, 222c) is included in the intermediate layer (222) and is disconnected by the at least one groove (G).

FIG. 8





EUROPEAN SEARCH REPORT

 Application Number
 EP 20 15 0647

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
L	US 2020/119304 A1 (CHOI WONWOO [KR] ET AL) 16 April 2020 (2020-04-16) * figures 1,7,9-16 * * claims * * paragraphs [0060], [0095], [0102], [0106], [0107], [0114], [0115], [0119], [0134], [0135], [0143], [0176], [0177] * * doubt on priority claim *	1,2,5, 11-15	INV. H01L27/32 H01L51/52
X,P	EP 3 565 004 A1 (SAMSUNG DISPLAY CO LTD [KR]) 6 November 2019 (2019-11-06) * figures 2,4-6 * * paragraphs [0061] - [0063], [0066], [0079], [0105] *	1,2,5, 11-15	
X,P	CN 110 416 435 A (WUHAN TIANMA MICRO ELECTRONICS CO LTD) 5 November 2019 (2019-11-05) * figures 1,2,3,12 * * paragraphs [0033] - [0037], [0046], [0050], [0053] *	1,2,5, 11-13,15	
A	US 2017/148856 A1 (CHEN X; CHOI J ET AL.) 25 May 2017 (2017-05-25) * the whole document *	1-16	
A	US 2018/151834 A1 (KANAYA HEISUKE [JP]) 31 May 2018 (2018-05-31) * the whole document *	1-16	
A	CN 107 579 171 A (BOE TECHNOLOGY GROUP CO LTD) 12 January 2018 (2018-01-12) * figures * -& US 2020/020752 A1 (SHI LING [CN] ET AL) 16 January 2020 (2020-01-16) * the whole document *	1-16	
		-/--	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 9 June 2020	Examiner De Laere, Ann
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)



EUROPEAN SEARCH REPORT

Application Number
EP 20 15 0647

5

10

15

20

25

30

35

40

45

50

55

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	JP 2018 124816 A (JAPAN DISPLAY INC) 9 August 2018 (2018-08-09) * figures * -& US 2019/348476 A1 (KATO DAISUKE [JP]) 14 November 2019 (2019-11-14) * the whole document * -----	6-10	
			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 9 June 2020	Examiner De Laere, Ann
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 20 15 0647

5

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.

09-06-2020

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2020119304 A1	16-04-2020	CN 111048551 A	21-04-2020
		JP 2020061354 A	16-04-2020
		KR 20200041420 A	22-04-2020
		US 2020119304 A1	16-04-2020
EP 3565004 A1	06-11-2019	CN 110429199 A	08-11-2019
		EP 3565004 A1	06-11-2019
		KR 20190126016 A	08-11-2019
		US 2019334120 A1	31-10-2019
CN 110416435 A	05-11-2019	NONE	
US 2017148856 A1	25-05-2017	US 2017148856 A1	25-05-2017
		US 2019157614 A1	23-05-2019
		US 2020106047 A1	02-04-2020
US 2018151834 A1	31-05-2018	JP 2018087863 A	07-06-2018
		US 2018151834 A1	31-05-2018
		US 2019123298 A1	25-04-2019
		US 2020176708 A1	04-06-2020
CN 107579171 A	12-01-2018	CN 107579171 A	12-01-2018
		EP 3678206 A1	08-07-2020
		US 2020020752 A1	16-01-2020
		WO 2019042340 A1	07-03-2019
US 2020020752 A1	16-01-2020	CN 107579171 A	12-01-2018
		EP 3678206 A1	08-07-2020
		US 2020020752 A1	16-01-2020
		WO 2019042340 A1	07-03-2019
JP 2018124816 A	09-08-2018	CN 110192171 A	30-08-2019
		JP 2018124816 A	09-08-2018
		KR 20190105640 A	17-09-2019
		US 2019348476 A1	14-11-2019
		WO 2018142739 A1	09-08-2018
US 2019348476 A1	14-11-2019	CN 110192171 A	30-08-2019
		JP 2018124816 A	09-08-2018
		KR 20190105640 A	17-09-2019
		US 2019348476 A1	14-11-2019
		WO 2018142739 A1	09-08-2018

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)	广告牌		
公开(公告)号	EP3683841A3	公开(公告)日	2020-07-29
申请号	EP2020150647	申请日	2020-01-08
[标]申请(专利权)人(译)	三星显示有限公司		
申请(专利权)人(译)	三星DISPLAY CO. , LTD.		
当前申请(专利权)人(译)	三星DISPLAY CO. , LTD.		
[标]发明人	PARK HYUNGJUN KWAK WONKYU JEONG JINTAE		
发明人	PARK, HYUNGJUN KWAK, WONKYU JEONG, JINTAE		
IPC分类号	H01L27/32 H01L51/52		
CPC分类号	H01L27/3258 H01L51/5237 H01L51/5253 H01L27/3276 H01L51/5056 H01L51/5072 H01L51/5088 H01L51/5092		
代理机构(译)	DR.威猛和合作伙伴		
优先权	1020190006924 2019-01-18 KR 1020190053907 2019-05-08 KR		
其他公开文献	EP3683841A2		
外部链接	Espacenet		

摘要(译)

显示面板(10-1)包括:基板(100),其包括第一区域(OA),第二区域(DA)以及
在第一区域(OA)和第二区域(DA)之间的第三区域(MA)。); 显示元件
(OLED)位于第二区域(DA)中,并且包括像素电极(221),相对电极(223)和中
间层(222); 多层膜(ML),其布置在基板(100)和像素电极(221)之间,并包括
有机绝缘层(209)和有机绝缘层上的无机层(210); 至少一个在多层膜中形
成并位于第三区域(MA)中的凹槽(G),其中至少一个有机材料层(222a,
222c)被包括在中间层(222)中,并且通过 至少一个凹槽(G)。

