(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 296 347 A3

(12) EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
02.04.2003 Bulletin 2003/14

(43) Date of publication A2:
26.03.2003 Bulletin 2003/13

(21) Application number: **02026323.2**

(22) Date of filing: **21.07.1999**

(51) Int Cl.[7]: **H01J 17/49**

(84) Designated Contracting States:
DE FR GB

(30) Priority: **22.07.1998 JP 20600598**
20.10.1998 JP 29824398
29.10.1998 JP 30818498
29.10.1998 JP 30818698

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:
99114333.0 / 0 975 001

(71) Applicant: **MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.**
Kadoma-shi, Osaka 571-8501 (JP)

(72) Inventors:
- **Kato, Tetsuya**
  Sagamihara-shi, Kanagawa, 228-0803 (JP)
- **Watanabe, Yoshio**
  Yokohama-shi, Kanagawa, 241-0801 (JP)
- **Kono, Hiroki**
  Kawasaki-shi, Kanagawa, 214-0036 (JP)

(74) Representative: **Balsters, Robert et al**
Novagraaf SA
25, Avenue du Pailly
1220 Les Avanchets - Geneva (CH)

(54) Plasma display panel, method of manufacturing the same, and display device using the same

(57) A plasma display panel ("PDP") is provided with a protrusion lower than barrier ribs on an inner surface of a back plate substrate, and a phosphor layer formed on a rib surface within a unitary emission unit including a surface of the protrusion, thereby realizing the PDP of high brightness, high luminous efficiency and long operating life. Also, the PDP has a structure, in which a portion (15) of the inner surface of the substrate (10) is opened to a discharge space directly or through a protective layer (12), so as to improve power consumption remarkably. Further, the invention provides a production of the PDP with superior whiteness by way of controlling a balance of each color with shape of the respective protrusions. Moreover, an electrode can be formed easily and precisely on an upper part of the protrusion by providing a sloped surface for at least one end in a longitudinal direction of the protrusion. As a result, the invention provides the PDP that is of low power consumption, high brightness, high luminous efficiency, and is capable of performing a speedy and stable electric-discharge and displaying white color of high color temperature.

EP 1 296 347 A3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 02 6323

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)
P,X	FR 2 762 426 A (SAMSUNG DISPLAY DEVICES CO LTD) 23 October 1998 (1998-10-23) * page 4, line 29 - page 5, line 13; figures 3,4 *	1,2,8	H01J17/49
A	PATENT ABSTRACTS OF JAPAN vol. 016, no. 215 (E-1204), 20 May 1992 (1992-05-20) -& JP 04 036923 A (FUJITSU LTD), 6 February 1992 (1992-02-06) * abstract *	6	
A	EP 0 284 138 A (MAGNAVOX CO) 28 September 1988 (1988-09-28) * column 2, line 55 - column 3, line 5 *	1,8	
A	US 3 589 789 A (HUBERT CARL R ET AL) 29 June 1971 (1971-06-29) * column 3, line 10 - line 26; figure 2 *	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

H01J

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	31 January 2003	F de Ruyter-Noordman

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 02 02 6323

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.

31-01-2003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 2762426 A	23-10-1998	KR 224739 B1	15-10-1999
		FR 2762426 A1	23-10-1998
		JP 10302649 A	13-11-1998
JP 04036923 A	06-02-1992	NONE	
EP 0284138 A	28-09-1988	US 4827186 A	02-05-1989
		CA 1283689 A1	30-04-1991
		DE 3852775 D1	02-03-1995
		DE 3852775 T2	24-08-1995
		EP 0284138 A2	28-09-1988
		IL 85750 A	29-03-1992
		JP 2628678 B2	09-07-1997
		JP 63244542 A	12-10-1988
US 3589789 A	29-06-1971	DE 1958674 A1	11-06-1970
		FR 2023839 A5	21-08-1970
		GB 1217290 A	31-12-1970

EPO FORM P0459

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