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**Datasheet for the decision  
of 6 October 2015**

**Case Number:** T 1794/11 - 3.4.03

**Application Number:** 07003971.4

**Publication Number:** 1783841

**IPC:** H01L33/00

**Language of the proceedings:** EN

**Title of invention:**

Light emitting devices and method for fabricating the same

**Applicant:**

LG Electronics, Inc.  
LG Innotek Co., Ltd.

**Headword:**

**Relevant legal provisions:**

EPC Art. 123(2)  
EPC R. 137(5)

**Keyword:**

Added subject-matter (yes) - main request  
Amended claim relating to unsearched and non-unitary subject-  
matter (yes) - auxiliary request

**Decisions cited:**

G 0002/92, T 0708/00

**Catchword:**



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Case Number: T 1794/11 - 3.4.03

**D E C I S I O N  
of Technical Board of Appeal 3.4.03  
of 6 October 2015**

**Appellant:** LG Electronics, Inc.  
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**Appellant:** LG Innotek Co., Ltd.  
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**Representative:** Cabinet Plasseraud  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted on 5 April 2011  
refusing European patent application No.  
07003971.4 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chairman** G. Eliasson  
**Members:** R. Bekkering  
C. Heath

## **Summary of Facts and Submissions**

I. The appeal is against the refusal of application No. 07 003 971 for not meeting the requirements of Article 123(2) EPC and Rule 137(5) EPC.

II. The present application is a divisional application of parent application No. 06 291 110.

III. With the statement setting out the grounds of appeal, the appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the following:

*Main request:*

Claims 1 to 5 according to the appellant's main request filed with the statement setting out the grounds of appeal,

*Auxiliary request:*

Claims 1 to 5 according to the appellant's auxiliary request filed with the statement setting out the grounds of appeal.

IV. Reference is made to the following document:

D1: DE 102 53 911 A.

V. A summons to oral proceedings appointed for 6 October 2015 was issued by the board, provided with an annexed communication in which a provisional opinion of the board on the matter was given.

In particular, the appellant was informed that it appeared that the subject-matter of claim 1 as amended according to the main request contained subject-matter, which extended beyond the content of the application as filed, contrary to the requirement of Article 123(2) EPC.

Claim 1 as amended according to the auxiliary request related to subject-matter, which was not searched and did not form a single general inventive concept with the invention originally claimed. Amended claim 1, therefore, did not meet the requirement of Rule 137(5) EPC.

- VI. With a fax dated 5 October 2015, the board was informed that the appellant would not attend the oral proceedings.

No arguments were provided by the appellant in response to the board's observations.

- VII. Oral proceedings were held on 6 October 2015 in the absence of the duly summoned appellant.

- VIII. Claim 1 of the appellant's main request reads as follows:

*"A light emitting device, comprising:  
a light emitting structure (100) including a first semiconductor (100a) layer with a first polarity, an active layer (100b) and a second semiconductor layer (100c) with a second polarity, which are sequentially stacked;  
characterized in that it further comprises: an insulation film formed at an entire lateral surface of the light emitting structure;*

*a first electrode formed on the second semiconductor layer with the second polarity;  
a seed layer formed at the insulation film and the first electrode;  
a second electrode formed under the first semiconductor layer with the first polarity;  
wherein the entire lateral surface of the light emitting structure is sequentially formed with the insulation film, the seed layer and a metallic film, the metallic film being further formed with a groove, and the seed layer being formed on the groove."*

- IX. Claim 1 of the appellant's auxiliary request corresponds to claim 1 of the main request, however with the last feature reading as follows:

*"wherein the entire lateral surface of the light emitting structure is sequentially formed with the insulation film, the seed layer and a metallic film, the metallic film being formed to wrap the top of the seed layer".*

- X. With the statement setting out the grounds of appeal, the appellant submitted in substance the following arguments:

In claim 1 according to the main request, the wording "*metallic*" was based on the description as originally filed (cf page 22, lines 15-17).

Moreover, the expression "*the seed layer is formed on the groove*" was based on figure 6e, which clearly showed a metallic film 310 being formed with a groove and a seed layer 140 being formed on this groove.

These amendments fulfilled thus the requirements of Article 123(2) EPC and overcame the objections under Article 123(2) EPC in the refusal decision.

Moreover, the objection under Rule 137(5) EPC in the refusal decision had to be set aside.

In order to fulfil the requirements of Rule 137(5) EPC, amended claims might not relate to a) unsearched subject-matter b) which did not combine with the originally claimed invention to form a single general inventive concept.

In order to determine if the amended claims combined with the originally claimed invention to form a single general inventive concept, it was necessary to compare the amended claims with the originally filed claims as if they had been filed simultaneously, and check if they fulfilled the requirements of unity as laid down in Article 82 EPC and Rule 44 EPC. This approach had been confirmed in decision T 0708/00.

Since claim 1 as originally filed and claim 1 as amended according to the main request both included the feature that the light emitting device comprised a first electrode formed on the second semiconductor layer with the second polarity and a second electrode formed under the first semiconductor layer with the first polarity, the requirement of unity of invention under Article 82 EPC was fulfilled.

Consequently, since the amended claims of the main request combined with the originally claimed invention to form a single general inventive concept, the requirements of Rule 137(5) EPC were fulfilled by the amended claims of the main request.

Also in claim 1 according to the auxiliary request, the wording "*metallic*" was based on the description as originally filed (cf page 22, lines 15-17).

Moreover, the expression "*the metallic film being formed to wrap the top of the seed layer*" was based on page 22, lines 15-17 of the originally filed description.

These amendments fulfilled thus the requirements of Article 123(2) EPC and overcame the objections under Article 123(2) EPC raised in the refusal decision.

A similar reasoning to the reasoning made with regard to the main request could be made with respect to the set of claims of the auxiliary request, since amended claim 1 in this set of claims also comprised the special technical feature that the light emitting device comprised a first electrode formed on the second semiconductor layer with the second polarity and a second electrode formed under the first semiconductor layer with the first polarity, which operated the technical relationship with originally filed claim 1.

For this reason, the requirements of Rule 137(5) EPC were also fulfilled by the amended claims of the auxiliary request.

## **Reasons for the Decision**

1. The appeal is admissible.

2. *Absence of the duly summoned appellant*

The duly summoned appellant did not attend the oral proceedings, as announced. The proceedings were continued without the appellant in accordance with Rule 71(2) EPC 1973, while the appellant was treated as relying only on its written case, Article 15(3) RPBA.

The board was in a position to decide at the conclusion of the oral proceedings, since the case was ready for decision (Article 15(5) and (6) RPBA), the voluntary absence of the appellant not being a reason for delaying the decision (Article 15(3) RPBA).

3. *Main request*

3.1 *Amendments*

Claim 1 according to the main request has been amended *inter alia* to contain the feature "*the metallic film being further formed with a groove, and the seed layer being formed on the groove*".

There is, however, no disclosure in the application as originally filed of such a metallic film formed with a groove. Moreover, there is no disclosure in the application as originally filed of the seed layer being formed on the groove.

The appellant argued that the amendment could be based on figure 6e, which clearly showed a metallic film 310 being formed with a groove and a seed layer 140 being formed on this groove.

There is, however, no mention of any groove in the originally description in conjunction with figure 6e,



or indeed in any part of the description relating to the embodiment of the invention shown in figures 6a to 6e (cf page 20, line 9 to page 24, line 17). The only mention of a groove in the original application is of a cutting groove (40) disclosed in relation with the prior art (cf page 3, line 17 to page 4, line 19 and figure 1d). There is no such groove present in figure 6e. Neither is there anything in figure 6e which could fairly be held to qualify as one. Where figure 6e shows a recess in the metallic film, corresponding to the light emitting structure (110), this does not constitute a groove, ie a long, narrow cut in a surface.

Moreover, there is no disclosure in the application as originally filed of the seed layer being formed on the groove. According to the application, the metallic film is formed on the seed layer, the seed layer being formed over the entire surface of the device.

Accordingly, claim 1 as amended according to the main request contains subject-matter, which extends beyond the content of the application as filed, contrary to the requirement of Article 123(2) EPC.

The appellant's main request is, therefore, not allowable.

#### 4. *Auxiliary request*

##### 4.1 *Amendments*

4.1.1 Amended claim 1 according to the auxiliary request relates to unsearched subject-matter, which does not combine with the originally claimed invention to form a

single general inventive concept and therefore does not meet the requirement of Rule 137(5) EPC.

4.1.2 In the search and examination procedure of the parent application, the application was found to lack unity within the meaning of Article 82 EPC, as it comprised two groups of claims relating to two different inventions.

As a first group, claims 1 to 18 of the parent application related to a method of fabricating light emitting devices wherein an etch film was used for separating a plurality of light emitting structures into individual devices. The technical problem solved by the first group of claims was to provide a method of individualizing light emitting devices without scribing. The problem was solved by forming an etch film covered by a metal film and etching the etch film after removal of the substrate.

As a second group, claims 19 to 21 of the parent application related to a light emitting device having a certain sequence of layers and films. The technical problem solved by the second group of claims was how to provide a light emitting device with alternative means for coupling out the light. The problem was solved in particular by forming a highly reflective film with insulating properties on lateral surfaces of the light emitting structure.

Only the first invention was pursued in the parent application. The second invention was pursued in the present divisional application. Indeed, claims 1 to 5 as originally filed in the present divisional application, of which claims 1 to 3 correspond to claims 19 to 21 of the parent application, relate to

the second invention concerning coupling out the light of the light emitting structure.

The search in the present divisional application was accordingly performed on this second invention and *inter alia* document D1 was found as relevant prior art.

In the course of the examination procedure, this second invention was examined and it was found that the subject-matter of claim 1 as originally filed lacked an inventive step in the sense of Article 56 EPC (cf the extended European search report of 23 April 2007, the corresponding communication pursuant to Article 96(2) EPC of 15 October 2007 and the summons to oral proceedings of 19 October 2010).

In particular, the examining division held that document D1 disclosed a light emitting diode 2 (figure 6) having slant lateral surfaces with a highly reflective film 9 being formed on said slant lateral surfaces (paragraph [0064]). D1 referred to the diode 2 as a radiation generating layer. However, it was implicit for the person skilled in the art that such a layer comprised an active layer being sandwiched between first and second semiconductor layers of opposite polarity, ie n- and p-type (cf decision under appeal, Reasons, point 2.1).

According to the examining division, the subject-matter of claim 1 as originally filed differed from D1 only in that:

- a) electrodes were formed on and under first and second semiconductor layers, and in that
- b) the reflective film had an insulating property.

The special technical features of claim 1 as originally filed related to insulating properties of a reflective film formed on lateral surfaces, since the formation of electrodes were trivial features. The corresponding technical problem related to light extraction efficiency.

The special technical features of amended claim 1 related to a metal film being formed with a groove, the groove being formed with a seed layer. The corresponding technical problem related to the separation of individual devices.

Neither the special technical features nor the problems of the original claims and the amended claims were the same or was there a technical relationship, which would justify unity of the two groups of inventions in the sense of Rule 44 EPC.

Consequently, the amended claims related to unsearched subject-matter, contrary to the requirements of Rule 137(5) EPC.

- 4.1.3 Referring to decision T 708/00, the appellant argued that in order to determine whether the amended claims fulfilled the requirements of Rule 137(5) EPC, it was necessary to compare the amended claims with the originally filed claims, as if they were filed simultaneously, and check if they fulfilled the requirements of unity as laid down in Article 82 EPC and Rule 44 EPC.

Claim 1 as originally filed and claim 1 as amended both included as the special technical feature relative to D1 that the light emitting device comprised a first electrode formed on the second semiconductor layer with

the second polarity and a second electrode formed under the first semiconductor layer with the first polarity.

Accordingly, there was a technical relationship within the meaning of Rule 44 EPC between the subject-matters of the originally filed claim 1 and the amended claim 1, since they both involved the same technical feature.

Consequently, the requirements of Rule 137(5) EPC were fulfilled by the amended claims.

- 4.1.4 The board notes, however, that in fact according to document D1, in order to prevent an electrical short circuit between the substrate and the contact layer, it might be very advantageous to apply an electrically insulating layer between the reflective material, which is advantageously silver or aluminium (cf paragraph [0064], figure 6). The layer of reflective material with such an electrically insulating layer constitutes a highly reflective film with an insulating property as per original claim 1.

Moreover, in D1 the light emitting device is provided with a first electrode (10) on the second semiconductor layer (1) with the second polarity (n-type) and with a second electrode (17) on the first semiconductor layer (2) with the first polarity (p-type) (cf paragraphs [0048], [0057], [0059]; figures 1, 3 to 6). Accordingly, the device of document D1 also includes first and second electrodes as per claim 1.

The subject-matter of claim 1 as originally filed, thus, in fact lacks novelty over D1 (Article 54(1) EPC 1973).

Accordingly, the features concerning the provision of the electrodes do not provide a contribution over the prior art in the sense of Rule 44(1) EPC.

There is, thus, no technical relationship among the two inventions involving one or more of the same or corresponding special technical features within the meaning of Rule 44(1) EPC. The requirement of unity of invention under Article 82 EPC is, thus, not fulfilled.

With the amendments according to the auxiliary request, the appellant is considered to revert back to the first invention. The amendments are based on the embodiment shown in figures 6a to 6e, which relates to the problem of individually dividing the light emitting structures without scribing.

The first invention, however, was not searched in the present divisional application and does not combine with the second invention originally claimed in the present divisional application to form a single general inventive concept. Amended claim 1 according to the auxiliary request, therefore, does not meet the requirement of Rule 137(5) EPC.

- 4.1.5 It is, moreover, noted that the outcome is in agreement with the Opinion of the Enlarged Board of Appeal G2/92 (OJ EPO 1993, 591), according to which at the examination stage, having regard to the requirement of unity of invention and the fact that only one examination fee can be paid for each application, clearly only one invention in each application is to be examined for conformity with the patentability and other requirements of the EPC (cf Reasons, point 2). As the above second invention has been examined in the

present application, there is no scope for turning to examining the above first invention.

4.1.6 The appellant's auxiliary request is, therefore, not allowable either.

## Order

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:



S. Sánchez Chiquero

G. Eliasson

Decision electronically authenticated